S. HRG. 114–368

S. 2031, THE AMERICAN SODA ASH COMPETITIVENESS ACT

HEARING

BEFORE THE

SUBCOMMITTEE ON PUBLIC LANDS, FORESTS, AND MINING

OF THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE

ONE HUNDRED FOURTEENTH CONGRESS

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S. 2031, THE AMERICAN SODA ASH COMPETITIVENESS ACT, A BILL TO REDUCE TEMPORARILY THE ROYALTY REQUIRED TO BE PAID FOR SODIUM PRODUCED ON FEDERAL LANDS, AND FOR OTHER PURPOSES

Thursday, October 1, 2015

U.S. SENATE SUBCOMMITTEE ON PUBLIC LANDS,
FORESTS, AND MINING
COMMITTEE ON ENERGY AND NATURAL RESOURCES
Washington, DC.

The Subcommittee met, pursuant to notice, at 2:40 p.m. in Room SD–366, Dirksen Senate Office Building, Hon. John Barrasso, Chairman of the Subcommittee, presiding.

OPENING STATEMENT OF HON. JOHN BARRASSO, U.S. SENATOR FROM WYOMING

Senator BARRASSO. The Committee will come to order. Senator Wyden is unavoidably detained.

This afternoon the Subcommittee on Public Lands, Forests, and Mining will hold a hearing on S. 2031, the American Soda Ash Competitiveness Act.

Last month the Subcommittee's Ranking Member, Senator Wyden, and I introduced this bipartisan legislation along with Senators Enzi and Merkley. The purpose of our bill is to help America's natural soda ash producers compete in the global market. Natural soda ash is also known as sodium carbonate. It is the raw material used to manufacture glass, chemicals and other industrial goods.

Natural soda ash is produced from Trona, a mineral found in high concentrations primarily in California and Wyoming. The production of soda ash supports thousands of jobs across the country in a variety of industries including mining, shipping and manufacturing. In my home State of Wyoming, soda ash production directly employs over 2,300 people.

In 2014, the United States exported nearly 58 percent of all soda ash produced for a total of $1.3 billion. Last year soda ash was our nation's second largest inorganic chemical export. Soda ash exports help reduce America's trade deficit and grow our nation's economy, but we must not assume that soda ash exports will increase. America's soda ash producers continue to battle unfair trade practices imposed by other nations.

For example, China has aggressively moved to help its synthetic soda ash producers capture market share from America's soda ash

producers. Since 2009, China has given its synthetic soda ash producers a nine-percent rebate on China's value-added tax, its V-A-T, it is VAT. More recently China devalued its currency, the Yuan, by 4.4 percent to boost exports.

It is estimated that China's value added tax rebate and currency devaluations give soda ash and China producers roughly a $27 per metric ton benefit. This unfair benefit is only expected to grow over the next year.

CNBC reported recently that China may devalue its currency by a total of 15 to 20 percent by the end of 2016.

[The information referred to follows:]

Why China's yuan may be set for 15% devaluation

Dhara Ranasinghe | @DharaCNBC

Wednesday, 16 Sep 2015 | 6:56 AM ET CNBC.com

China is mulling a 15-20 percent devaluation of its currency by the end of 2016 in a move that could spark a crisis in Asian markets, according to research firm IDEAglobal.

It cited an interview it had conducted with a "reliably-informed Asian source" in a release published late on Tuesday.

China, the world's second-largest economy after the U.S., devalued its currency last month in a bid to help exporters. The country is grappling with a softening economy and wild swings in the stock market.

"Having achieved a 3 percent move in a few weeks, they would not want to stop here. Their ultimate target is probably a 15 to 20 percent minimum move in the trade-weighted index," IDEAglobal cited the source as saying in an interview.

The yuan was trading at about 6.3708 per dollar on Wednesday, having weakened to four year-low around 6.45 after last month's surprise devaluation.

According to the source, the push for a weaker yuan has to be seen in the context of sharp falls in other Asian currencies such as the Japanese yen that have given Japanese exporters a competitive edge.

The Japanese yen has shed more than 50 percent of its value against the dollar in the past three years against a backdrop of aggressive monetary stimulus from the Bank of Japan.

China's surprise yuan devaluation last month meanwhile sparked fresh concerns about a global "currency war" – whereby countries devalue their currency in a tit-for-tat scrabble to gain a competitive edge -- and unfair protection of exporters by Beijing.

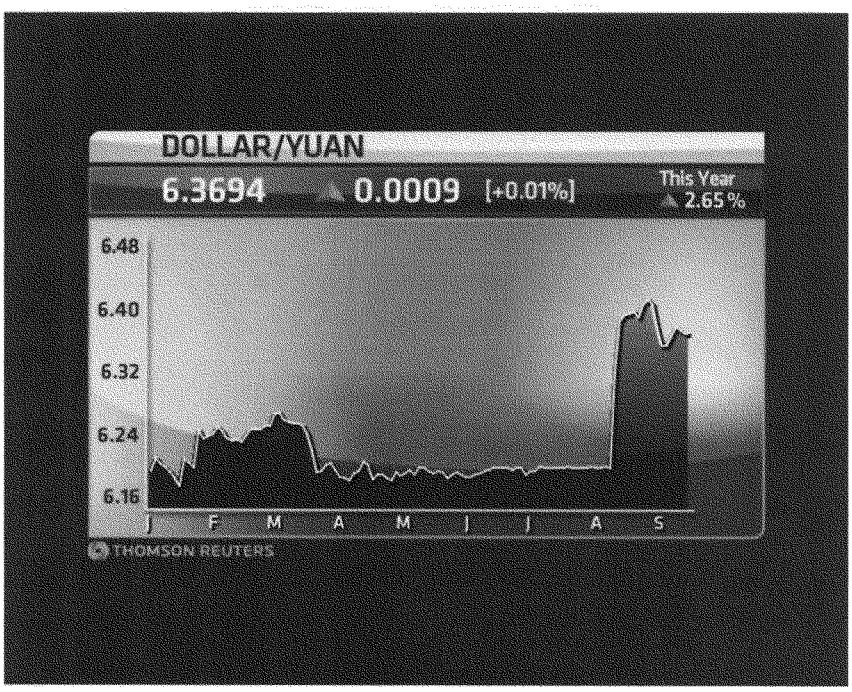
IDEAglobal published a question and answer session with its source, who said Beijing was keen on another 6 percent fall in the yuan from current levels by year-end and a further 10 percent next year.

"Engineering a devaluation of this magnitude will not be easy, especially given market chaos," the source said. "However, the PBOC has the mechanism to influence the daily fix with covert interventions by networked players to achieve a creeping devaluation and maintain the appearance of it being "market-led"."

If the dollar continues on its uptrend, the U.S. currency would take most of the adjustment in the yuan, the source added.

Asked whether a further currency move by Beijing would trigger capital flight with significant repercussions for Asian markets, the source said: "It is realistic to expect a crisis in Asian foreign exchange and asset markets of some size."

"This will emerge as the market starts to appreciate the real motivations and scale of ambitions on the Renminbi adjustment."



CNBC cited a source that said, "Engineering a devaluation of this magnitude would not be easy." However, they talk about the People's Bank of China, "has the mechanism to achieve a creeping devaluation and maintain the appearance of it being market led."

This report and China's track record on currency devaluation make me very skeptical and suspicious of any communications or any commitments that China's president allegedly made last week. China's unfair trade practices threaten America's soda ash producers, and it is important that Congress respond.

That is why we have introduced the American Soda Ash Competitiveness Act. Our bipartisan bill will help level the playing field for America's soda ash producers. Specifically, our bill maintains a competitive royalty rate for soda ash produced from Federal land.

Tomorrow the Bureau of Land Management, the BLM, is expected to increase the royalty rate on soda ash. I strongly disagree with this decision. The Administration should not raise costs on America's soda ash producers without first ensuring that China and other countries scrap their unfair trade practices.

So I want to thank Senator Wyden for his support of this bipartisan legislation. Senator Wyden knows the importance of the soda ash industry to Oregon, Wyoming and communities throughout the country. He also knows that America's natural soda ash has a significantly lower environmental impact when compared to China's synthetic soda ash.

I also want to thank Senators Enzi and Merkley for their support of this bill.

On July 29th, the House Natural Resources Committee approved identical legislation on a bipartisan vote. I will encourage members of this Committee to advance our legislation as quickly as possible.

I would also like to point out a front page story in yesterday's Wall Street Journal entitled, "Export Weakness Hampers Growth." According to the study, hopes for an American export boom are wilting. U.S. exports are on track to decline this year for the first time since the financial crisis, undermining a national push to boost shipments abroad. The article goes on to say that the weak trade performance is restraining overall economic growth. The article also discusses the challenges that Portland, Oregon has faced in trying to increase its exports.

I will enter this article in today's hearing record.

[The information referred to follows:]

:DNESDAY, SEPTEMBER 30, 2015 - VOL. CCLXVI NO. 77 WSJ.com ★★★★ $3.00

Export Weakness Hampers Growth

by MARK PETTIS
AND BEN LEUBSDORF

Hopes for an American export boom are wilting under the weight of a strong dollar and global economic strains.

U.S. exports are on track to decline this year for the first time since the financial crisis, undermining a national push to boost shipments abroad. Through July, exports of goods and services were down 3.5% compared with the same period last year. New data released Tuesday by the Commerce Department showed that exports of U.S. goods sank a seasonally adjusted 3.2% in August to their lowest level in years.

The weak trade performance is restraining overall economic growth, a sign of how troubles in China and other major economies are dinging the U.S. economy.

"Foreign demand remains the weakest part of the economy," said Jim O'Sullivan, chief U.S. economist at consulting firm High Frequency Economics.

It didn't seem that way in 2010, when President Barack Obama set a goal of doubling exports over five years. Some

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GOODS

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big cities took up the challenge, including Portland, Ore.

Facing a battered economy at home, Vanessa Keitges, president of Portland-based Columbia Green Technologies, lined up sales in Belgium and New Zealand. In Canada, she chased public-building projects and Wal-Marts. Within three years, one-quarter of the green-roofing company's sales were outside the U.S.

But that proved to be a high-water mark for the company's foreign ambitions. Ms. Keitges is now focusing on the strengthening domestic market for the company's rooftop planters as weak growth abroad tempers demand and a strong dollar creates pricing problems.

Exports seemed a golden opportunity as Portland and the rest of the nation emerged from the 2007-09 recession. Foreign sales were a major contributor to U.S. economic growth in 2010 and 2011, outstripping past recoveries. Political leaders hoped selling goods and services abroad would offer a sustained boost to the job market at home.

But the dream of an export boom has faded.

As unemployment has declined, American consumers have reasserted their dominant role in driving economic growth. And a strong dollar and weakness overseas have helped turn international trade into a drain on overall economic growth in four of the past six quarters.

The Federal Reserve worries exports will be a persistent drag on the broader economy going forward. Fed Vice Chairman Stanley Fischer in August said it was "plausible to think that the rise in the dollar over the past year would restrain growth...through 2016 and perhaps into 2017." If the Fed begins to raise short-term interest rates later this year, that could provide new fuel to push the dollar's value even higher.

Exports of goods and services grew 80% from 2003 to 2008, but then expanded only 48% from 2009 to 2014, according to Census Bureau data.

A Commerce Department official described President Obama's export-growth initiative as "catalytic and a success," driving exports "despite strong global economic headwinds and macroeconomic factors outside our control."

Falling Short

Annual change in the value of U.S. exports of goods and services

Source: Census Bureau
THE WALL STREET JOURNAL.

The administration is looking to spur trade growth through agreements such as the Trans-Pacific Partnership. Senior officials from around the world are meeting in Atlanta, trying to complete the expansive trade deal after talks stalled earlier this year.

It isn't just the U.S. where exports have been a disappointment in recent years. Globally, growth in trade volume is set to trail the pace of economic growth for the third year in a row, and trade growth has been averaging just half its pre-financial crisis pace.

In the immediate aftermath of the recession, confronted by weakness in the domestic economy, U.S. policy makers saw opportunity in global markets.

Following Mr. Obama's lead, the Portland metro region in 2012 set its own goal to double its exports in five years. "This is how we fight for jobs in the next economy," then-Portland Mayor Sam Adams declared.

In the past year, Portland has quietly shelved that aim. The value of Portland-area exports actually declined slightly between 2012 and 2014, according to tallies from the Commerce Department and the Brookings Institution, a Washington think tank.

After Portland set its goal, economic conditions started to shift. The value of major currencies declined relative to the dollar, making American-made goods more expensive for foreign customers. Growth slowed in key markets such as China and Canada. At home, the U.S. economy regained its footing.

Over the past year, Portland first was caught up in a labor dispute that caused gridlock at ports along the West Coast, then it lost regular ocean-bound container service. Local officials also came to realize export growth depended overwhelmingly on chip maker Intel Corp., which has extensive facilities in the Portland suburbs.

Exports of computer and electronic products helped drive a more than doubling of the metro area's exports between 2003 and 2008, according to Brookings. But Intel has suffered from a slowdown in demand for personal computers.

Measurable gains from smaller companies are likely to take years to materialize. Federal estimates show only about 5% of U.S. firms export, with nearly two-thirds of the annual value concentrated among 500 companies.

Hand-tool maker Astro Tool Corp. in the Portland suburb of Beaverton has seen many of the challenges up close. Over the past year, general manager Mike Barnes dedicated half his time to chasing foreign customers, while still overseeing day-to-day operations of the 30-employee company. He faced a steep learning curve. "We, A, didn't know how to do it, and B, we didn't have the money to do it," he said. "You can't just go to the Internet and say, 'Where do we find foreign opportunities?'"

He eventually landed a small grant to hire a consultant and tapped connections for advice. The share of Astro's business coming from overseas climbed over the past year to 25% from 15%. But he also watched at a trade show as a foreign competitor sold a cheap, knockoff version of a product similar to his.

Mr. Adams, the former mayor, remains a strong advocate for the goal of doubling exports—if not by 2017, then eventually. He worries the Portland economy isn't keeping up with the quality of life that draws twenty- and thirty-somethings at an enviable rate.

"Obviously the timeline will move, but keeping that goal front and center is key," he said.

Senator BARRASSO. As we await other members of the Committee, we will hear at this time from our witnesses.

Joining us this afternoon is Ms. Amanda Leiter, Deputy Assistant Secretary for Land and Minerals Management at the Department of Interior. Thank you for being with us. Mr. Chris Douville, who is the President of ANSAC, the American Natural Soda Ash Corporation. Mr. Rick Finn, Federal Affairs Manager for the Port of Portland. And Fred von Ahrens, who is Vice President of Manufacturing for Tronox, who came here from Green River, Wyoming today.

Welcome to all of you. I look forward to your testimony.

Ms. Leiter, let's start with you.

STATEMENT OF AMANDA LEITER, DEPUTY ASSISTANT SECRETARY, LAND & MINERALS MANAGEMENT, U.S. DEPARTMENT OF THE INTERIOR

Ms. LEITER. Chairman Barrasso, absent members of the Committee, thank you for the opportunity to testify on S. 2031, the American Soda Ash Competitiveness Act.

As you just stated this bill would reinstate for five years the soda ash royalty rate reduction enacted in 2006 that expired in October 2011.

The Department of the Interior cannot support S. 2031 because the act would not provide a fair return to the American public, and the economic evidence from 2006 to 2011 does not indicate that this sort of royalty reductions substantially increases soda ash production, jobs or exports.

As you noted, soda ash is a key ingredient in many products including glass, detergents and baking soda. It is refined from the mineral Trona or it can be manufactured synthetically. The United States is a leading producer of soda ash with the world's largest natural deposit of Trona in Southwestern Wyoming.

As of Fiscal Year 2014, there were 78 Federal sodium leases spanning nearly 99,000 acres across five states, Wyoming, California, Colorado, Arizona and New Mexico. Fifty-five of the leases were in Wyoming.

The soda ash industry contributes substantially to U.S. gross domestic product. In 2014, the total value of the domestic soda ash produced was about $1.7 billion and the industry directly supplied 2,500 jobs.

S. 2031 would reinstate the two-percent royalty rate established by the Soda Ash Royalty Reduction Act of 2006, which expired in October 2011. From October 2011 to October 2013, royalty rates returned to the rates set in each individual lease. In 2013, the Helium Stewardship Act included a provision that, again, waived lease terms and set a four-percent royalty rate for two years, and that provision expires today.

As mandated by the 2006 act, the BLM reported to Congress on the impact of the royalty reduction between 2006 and 2011. That 2011 report found that the 2006 act resulted in a substantial loss of royalty revenues to the Federal Government, $150 million, far exceeding congressional estimates from 2006.

The BLM also found that the rate reduction did not appear to have significantly contributed to the creation of new jobs in the in-

dustry nor to have created, excuse me, nor to have increased exports nor to have notably increased the industry's capital expenditures to enhance production.

The report did find that a significant amount of production had shifted from state and private leases on to Federal leases.

As a steward of America's public lands, the Department of the Interior takes seriously our responsibility to receive a fair return for the mineral resources we manage on behalf of the American people. S. 2031 would waive the requirements of the Federal Land Policy and Management Act of 1976 which states that it is United States' policy to receive fair market value for the use of public lands and resources.

In a 1996 study, the BLM found that in Wyoming's Green River Basin the soda ash royalty rate was eight percent on most private lands and five percent on state lands. As a result of the study the BLM determined that the fair market value royalty rate for all then existing Federal leases in Wyoming would be increased from five to six percent, and the royalty rate on all new leases in Wyoming would be eight percent. We have no reason to believe that state and private royalty rates have changed from five and eight percent, respectively.

In Fiscal Year 2014 under the Helium Stewardship Act four percent rate, the soda ash industry paid almost $42 million in royalty for production from Federal lands. If the royalty rate had been just two percent during Fiscal Year 2014, the royalty revenue for that year would have been 50 percent lower representing a loss of $21 million to Federal and State taxpayers.

Current United States Geological Survey data indicate that the soda ash industry has increased production, exports and job numbers over the last four years regardless of the changing royalty rate. These data provide no economic justification for a rate reduction.

For these reasons, and especially because S. 2031 would not provide a fair return for the use of public resources, the Department of the Interior cannot support this bill.

Mr. Chairman, thank you for the opportunity to testify today. I'd be happy to answer any questions.

[The prepared statement of Ms. Leiter follows:]

Statement of
Amanda Leiter
Deputy Assistant Secretary, Land & Minerals Management
U.S. Department of the Interior
Before the U.S. Senate Committee on Energy and Natural Resources
Subcommittee on Public Lands, Forests, and Mining
Legislative Hearing on
S. 2031, American Soda Ash Competitiveness Act
October 1, 2015

Introduction

Thank you for the opportunity to testify on S. 2031, the American Soda Ash Competitiveness Act. This bill would reinstate for five years the royalty rate reduction provided for under the Soda Ash Royalty Reduction Act of 2006, which expired in October 2011. The BLM cannot support S. 2031.

Background

One of several products derived from sodium minerals mined on public lands, soda ash is used in many common products, including glass, pulp paper, detergents, and baking soda. Soda ash may either be manufactured synthetically or extracted from mined deposits of the mineral trona, a naturally occurring mixture of sodium carbonate, sodium bicarbonate, and water. Synthetic soda ash production began in this country in the 1880s and increased as the demand for soda ash increased. In the early 1950s, the modern natural soda ash industry began in the Green River Basin of Wyoming, home of the world's largest known natural deposit of trona, where soda ash, or "sodium carbonate," is refined from trona mined at depths of between 800 and 1,600 feet below the surface.

In 2014, the U.S. soda ash industry consisted of five companies that mined and milled soda ash, four of which operated five plants in Wyoming. One company in California produced soda ash from sodium-carbonate rich brines. At the end of FY 2014, there were 78 Federal sodium leases covering 98,967 acres in Wyoming, California, Colorado, Arizona, and New Mexico. Fifty-five of these Federal sodium leases were located in Wyoming. The soda ash industry is a substantial contributor to the gross domestic product of the United States, with the total value of domestic soda ash produced in 2014 being about $1.7 billion and the industry supplying about 2,500 direct jobs. Soda ash is also a key ingredient in many diverse products, including flat glass used by the automobile and construction industries.

Soda Ash Royalty Reduction Act of 2006

In 2006, Congress passed the Soda Ash Royalty Reduction Act (2006 Act), which reduced the Federal royalty rate for soda ash to two percent. Before the 2006 Act went into effect, the BLM was charging royalty rates of six and eight percent. The BLM established these rates based on a 1996 study to examine the fair market value in the sodium industry in Wyoming. The study reviewed many comparable State and private leases and found that fair market value in Wyoming appeared to be somewhat higher than the five percent previously being charged by the BLM. As a result of the study, the BLM determined that the fair market value royalty rate for all then-existing Federal leases in Wyoming would be increased from five to six percent at the lease renewal date. The BLM, based on the study, also determined that the royalty rate on all new leases in Wyoming would be eight percent. In the Green River Basin at that time, the royalty

rate was eight percent on most private lands, and five percent on State lands. Those new rates went into effect in 1996 but the 2006 Act subsequently waived the terms of all applicable leases.

In 2011, the two percent royalty rate established under the 2006 Act expired, and the preexisting lease rates went back into effect. In 2013, however, the Helium Stewardship Act (P.L. 113-40) included a provision that set a four percent royalty rate for a two-year period. This provision is scheduled to expire on October 1, 2015.

2011 Report to Congress

As mandated by the 2006 Act, the BLM reported to Congress in the fall of 2011 on the impact of the royalty reduction over the previous five years. The report, "U.S. Department of the Interior Report to Congress: The Soda Ash Royalty Reduction Act of 2006," found that the 2006 Act resulted in a substantial loss of royalty revenues to the Federal government and the States and that revenue loss exceeded congressional estimates at the time of enactment. It also stated that the royalty rate reduction did not appear to have contributed in a significant way to the creation of new jobs within the industry, increased exports, or a notable increase in capital expenditures to enhance production. Furthermore, the report found that the royalty rate reduction appeared to have influenced an approximately two million ton shift of annual production away from State leases and private lands and onto Federal leases, and that, with regard to global competitiveness, U.S. production remained stable.

S. 2031, American Soda Ash Competitiveness Act

S. 2031 would reinstate for five years the two percent royalty rate for soda ash, a further reduction from the current four percent rate set to expire on October 1, 2015. Specifically, the bill would apply an across-the-board reduction in the royalty rate on soda ash leases from the 2006 fair market value average of 5.6 percent to two percent for five years. In FY 2014 (under the 4 percent rate mandated by the Helium Stewardship Act), the soda ash industry paid almost $42 million in royalty for production from Federal lands. If the royalty rate had been reduced to 2 percent during FY 2014, the royalty revenue for that year would have been 50 percent lower – approximately $21 million, a reduction of about $21 million from the current reduced royalty rate and an estimated reduction of about $37.8 million from the 2006 average fair market value rate. In addition to resulting in a loss of revenue to the U.S. Treasury, S. 2031 would waive the requirements of section 102(a)(9) of the Federal Land Policy and Management Act of 1976 (FLPMA), which states that it is the policy of the United States.to receive fair market value for the use of public lands and their resources unless otherwise provided by statute. Furthermore, S. 2031 would waive the terms of any applicable leases. The Department believes it is important to ensure a fair return to the U.S. tax payer. For this reason, and because the royalty rate reductions from 2006 to 2011 did not appear to have contributed in a significant way to the creation of new jobs, increased exports, or a notable increase in capital expenditures to enhance production, the BLM cannot support S. 2031.

Conclusion

Thank you for the opportunity to provide testimony on S. 2031. I would be happy to answer any questions you may have.

Senator BARRASSO. Thank you very much, Ms. Leiter, I appreciate your testimony.

As I mentioned earlier, Senator Wyden is unavoidably detained. Breaking news out of Oregon is there has been a shooting, with ten people killed, and as many as 20 others injured at a community college. I know that Senator Wyden has other pressing issues affecting him.

Mr. Douville, if you could please give your testimony.

STATEMENT OF CHRISTOPHER DOUVILLE, PRESIDENT, AMERICAN NATURAL SODA ASH CORPORATION (ANSAC)

Mr. DOUVILLE. Chairman Barrasso, thank you for the opportunity to testify on S. 2031, the American Soda Ash Competitiveness Act. I am Chris Douville, President of ANSAC, which is the world's largest soda ash exporter.

ANSAC was established in 1984 as the export arm of the U.S. national soda ash industry. We handle the sales, marketing and logistics operation in global export territories for three leading producers of soda ash in the United States, Tronox, Tata Chemicals and OCI.

I join my industry colleagues today in voicing support for this legislation. With U.S. soda ash exports facing the combined headwinds of a shaky global economy and increasingly aggressive foreign competition, a reduction of the royalty rate is needed now more than ever.

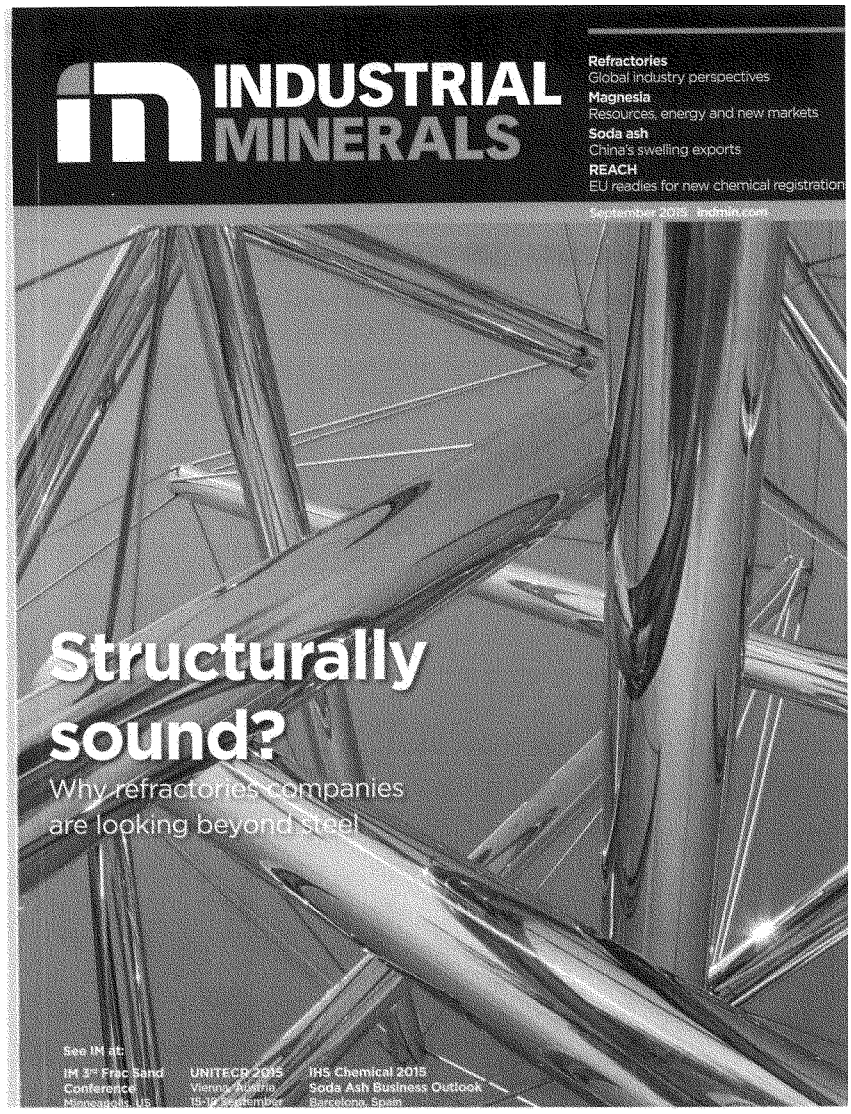
I would like to highlight several issues as you consider this legislation. First, the U.S. soda ash industry, thanks in part to previous royalty reductions, has increasingly expanded exports. Second, U.S. natural soda ash is facing growing competition in developing countries from China's synthetic soda ash. Third, the outlook for exports is expected to worsen in the year ahead as global soda ash demand growth in emerging markets is in decline.

From the perspective of ANSAC enactment of this legislation is absolutely critical to maintain U.S. jobs and export competitiveness. At the quantities of 6.7 million metric tons, valued at $1.3 billion in 2014, U.S. natural soda ash exports have directly contributed to thousands of high paying, U.S. jobs and served to put a dent in the U.S. trade deficit. In 2014, 58 percent of U.S. natural soda ash production was exported compared to 42 percent in 2005, the year before the royalty rate was first reduced. Thus, the royalty rate reduction has greatly helped to support additional export growth.

The U.S. is not only the leading soda ash export in the world, it is also the most efficient and environmentally friendly. U.S. natural soda ash consumes far less energy and produces fewer global greenhouse gas emissions on a delivered basis than synthetic soda ash. Despite the efficiency and environmental advantages of U.S. natural soda ash production, China has overtaken the United States as the world's largest soda ash producer, now making 115 percent more soda ash than the U.S.

The percentage of Chinese soda ash exports is on the rise as evidenced by the September 2015 Industrial Minerals article titled, "Chinese Soda Ash Mission Creep," which I would like to submit for the record.

Senator BARRASSO. Without objection.
[The information referred to follows:]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Chinese soda ash: Mission creep

Rising supply and contracting domestic demand for Chinese soda ash is upping the rate of overspill into exports. *Laura Syrett, Acting Editor,* looks at how this trend is threatening the market share of other exporters, including the highly influential North American trade body, ANSAC.

China's soda ash industry has set its sights on a larger share of the global market. Although it has scaled back its capacity expansion plans considerably in the last year, production levels are still rising and the country's producers are looking for external markets to offload material that cannot be consumed domestically.

According to Marguerite Morrin, senior director of chlor alkali and soda ash at IHS Chemical, China produced 25.28m tonnes soda ash in 2014, although total capacity in the country stands at around 32m tonnes. IHS estimates that China exported 7-8% of its soda ash production last year, with 90% going to Asian markets: of this, 17% went to the Indian sub-continent; 27% to northeast Asia; and 45% to Southeast Asia.

Chinese exports to Asia are increasing and, significantly, encroaching on the market share of the American National Soda Ash Corp. (ANSAC) – the marketing body in charge of exporting US-produced soda ash. For its part, the US produced around 11.66m tonnes soda ash last year and is the single biggest exporter of the material in the world, accounting for 49% of all soda ash traded globally. Around 36% of US exports go to Asia, having increased significantly since 2011. In 2014, US soda ash exports were higher by 43%, or 348,000 tonnes, than they were in 2011, whereas Chinese exports had only increased by 18%, or 137,000 tonnes, over the same period.

This year, however, China has been much more aggressive with its exports, and its share of the Asian market has grown much more rapidly than that of the US.

"In the first five months of 2015, the US was still a bigger supplier to the rest of Asia (excluding China) than China," Morrin told **IM**. "But Chinese volumes to Asia have increased by 200,000 tonnes, or 34%, whereas US exports in this period only grew by 33,000 tonnes, or 3%."

"The single biggest increase in Chinese exports in the first six months of this year was to Indonesia, where volumes increased by 52,000 tonnes, or 73%. The second biggest increase was to Bangladesh, with volumes up by 48,000 tonnes, or 66%," Morrin explained.

China's soda ash industry is at a cost disadvantage compared to the US, which produces the material from natural mineral (trona) deposits in Wyoming.

China, by contrast, has very little natural soda ash production and makes most of its material synthetically from limestone and salt, using either the Hou process (developed by Chinese chemist, Hou Debang, in the 1930s, which produces ammonium chloride as a by-product) or the Solvay process (developed by Belgian chemist Ernest Solvay in the 1860s, requiring less energy and fewer raw material inputs than the Hou process, but without the ammonium-chloride by-product).

According to Morrin, in 2014, 45% of Chinese soda ash was produced via the Hou process while 48% came from the Solvay process.

Chinese overcapacity

The increase in Chinese exports is due to a combination of excess domestic capacity and a decline in local demand. Because the main market for soda ash is glass manufacturing, its consumption is linked to the construction market, which has effectively stalled in China.

According to the RICS China Construction Market Monitor, Chinese construction stabilised in the first quarter of 2015, after two consecutive quarters of decline. Early indications for Q2 suggested that the market remained flat during this period, although house prices had started to inch up.

"Continuing weakness in the wider economy has affected the prospects of the construction industry. More specifically, the residential and commercial markets have witnessed a continued downward trend, which is unlikely to improve notably this year," said Andy Wu, senior economist at RICS.

"Looking ahead, the construction market is expected to remain flat at best this year and then show some pick-up next year." Wu added. This, combined with a slumping automotive market, which contracted by 6.6% in July, has had a knock-on effect on the glass industry.

Nearly a quarter of all Chinese glass companies saw their profits shrink in the first half of 2015.

Soda ash

Sodium carbonate, popularly known as soda ash, is a white, crystalline soluble material with the chemical formula Na_2CO_3 and is an essential ingredient in the manufacture of detergents, soaps, sodium-based chemicals, float glass, container and specialty glasses, silicates and other industrial chemicals. It is also widely used in textiles, paper, metallurgical industries and desalination plants.

Soda ash is produced in two forms – light and dense – the difference being bulk density and their respective uses. Dense soda ash has a bulk density of around 1 tonne/m³ and a particle-median-diameter (D50) of 300-500 microns and is the preferred grade for glass making. Light soda ash has a bulk density of around 500kg/m³ and a D50 of approximately 100 microns and is favoured for detergent and chemical applications.

In developed economies, where liquid detergents have overtaken powders as the cleansing agents of choice, glass tends to be the main driver of soda ash consumption. In emerging economies, particularly in Asia, detergent and soap applications still account for a significant proportion of soda ash consumption.

Soda ash can also be either natural or synthetic. Natural soda ash is made from Na_2CO_3-containing brines or from the naturally-occurring mineral, trona. Synthetic material is produced via the ammonia-soda (Hou) process or Solvay process from salt and limestone. Both end products are essentially the same, but natural soda ash tends to have a cost advantage over synthetic material, owing to lower energy and raw material inputs.

The world's largest producers of natural soda ash are the US, which produced 11.66m tonnes soda ash in 2014, according to IHS, and Turkey, which produced 2m tonnes last year, based on figures from the US Geological Survey (USGS), with smaller volumes coming from Kenya (420,000 tonnes in 2014), Mexico (280,000 tonnes) and Botswana (250,000 tonnes).

Major manufacturers of synthetic soda ash are China and India.

For flat glass, Chinese production dropped by 3.9% year-on-year (y-o-y) in H1 this year, while annual demand growth declined from 11.3% in 2013 to 1.1% in 2014, and is expected to fall into negative growth this year, pushing the market into depression and leaving a gap in soda ash demand.

Even though the country already produces more soda ash than it consumes and prices are falling, production capacity continues to rise at a rapid rate. More than a million tonnes is set to be added to China's soda ash output by the end of this year, with additional supply expected to come, for instance, from China Salt Kunshan Co. Ltd and Qinghai Salt Lake Magnesium Co. Ltd, which are each scheduled to commission new production lines of 600,000 tpa.

The recovery of the ammonium chloride market, helped by a relaxation in Chinese export policies for the material and the introduction of a 5% flat export tax replacing a seasonally variable rate, has also boosted soda ash output.

"Ammonium chloride prices have been very weak for a number of years," Morrin said. "Recently, though, prices have improved, which has given a boost to the Hou-based producers – this is also supporting the strong exports that we have seen recently."

In the Hou combined-soda process, the output ratio of soda ash to ammonium chloride is 1:1 and the rising price of ammonium chloride has pushed previously loss-making producers of soda ash into profit. According to China Customs data, in H1 2015, China exported 576,056 tonnes ammonium chloride, up 189.3% y-o-y.

It is hoped that, by increasing exports, Chinese soda ash producers can ease some of the pressure on their mounting inventories, with estimates placing the country's present overproduction at somewhere between 5m and 10m tpa.

Global demand

In its "2014 Chemical Soda Ash Analysis" report, IHS forecast that global soda ash demand will increase by 34% from 55m tpa in 2014 to 73m tpa in 2023 (a 2015 version of this report was being prepared at the time IM went to press), which may absorb some of China's additional capacity.

However, Chinese market observers have suggested that the rate of increase in consumption is not expected to keep pace with China's production, and with large new projects set to come on stream in Turkey by 2018 and US output showing no signs of slowing down, there is likely to be competition for market share.

ANSAC did not respond to requests for comment when contacted by IM, but the corporation has been vocal in its support for US trade policies that aim to protect and promote domestic soda ash producers.

In May this year, ANSAC applauded a US Senate vote to begin debating the Bipartisan Congressional Trade Priorities and Accountability Act 2015, also known at the trade promotion authority (TPA), which aims to set priorities for US trade negotiators and allow free trade agreements to be brought to Congress without amendment.

"Allowing Congress to assert its authority over ongoing trade negotiations paves the way for future passage of new free trade agreements," said Christopher Douville, ANSAC's president, following the vote on 14 May. "Such agreements are vital for the elimination of foreign market access barriers for soda ash and the continued growth of US soda ash exports," he added.

Other recent policies have included The American Soda Ash Competitiveness Act, introduced by California congressman, Paul Cook, in April, which would reduce government royalties on soda ash from 4% to 2%, fixed for the next five years.

Cook said that China was becoming an ever more dominant soda ash presence, thanks to its "heavily subsidised" domestic industry – referring to the credit Chinese manufacturers receive for ammonium chloride production – and that the US needs find ways to maintain market share.

"While American soda ash is found naturally, Chinese soda ash is produced synthetically. Chinese synthetic production uses twice the energy which results in over three times the carbon emissions as natural soda ash production," a US Government press release on the matter said.

In a statement on his personal website, Cook said that protecting the US soda ash industry was a matter of national security. "This is an important bill that will protect a vital industry, grow jobs, and do this with little impact to the federal budget. [Soda ash] production is a $1.8bn industry within the US, providing over 3,000 direct jobs," he outlined.

India has also raised concerns about the threat of Chinese exports to its domestic soda ash industry, which is likewise based on synthetic production, and currently benefits from an anti-dumping duty (ADD) on imports, although this is set to expire in 2017.

India produced 2.375m tonnes soda ash in 2013-2014, according to official estimates, and local manufacturers have plans to increase this to 4m tpa before the ADD is lifted. Industry leaders have also indicated their intention to approach the government and request an extension to the tariff, in a bid to protect to the domestic market. On 21 July the All India Glass Manufacturers Federation (AIGMF) initiated an anti-dumping review to determine whether the ADD should remain in place, giving relevant parties 40 days to respond.

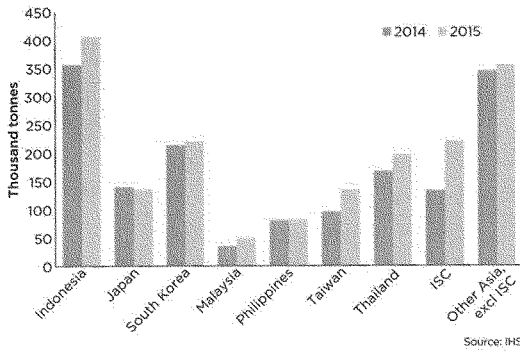
Soda ash prices

This decline in demand has also been reflected in prices for Chinese soda ash. China's export prices for dense and light soda ash weakened in July as Chinese producers cut offers by around $5/tonne in an effort to stimulate demand.

At the time IM went to press in late August, FOB China prices for soda ash (dense and light) stood at $210-230/tonne. This was at odds with the US industry, where producers reported stronger international pricing in H1.

Industry participants have diverged in their outlook for prices for the remainder of this year. US-based suppliers have suggested that there is still some margin for growth, but others have warned that the rise in Chinese export capacity may erode selling values sooner than predicted.

Asia soda ash imports from US and China (January-May 2015)



Source: IHS

Mr. DOUVILLE. China's domestic demand growth has fallen to its lowest level since 2009. As Chinese producers seek an outlet for their excessive annual production capacity, we forecast the Chinese exports could increase 22 percent in 2015.

Since 2009, China has promoted the export of soda ash by offering its producers a nine-percent rebate of the country's 17 percent VAT on their exports. More recently, the government's 4.4 percent devaluation of China's currency in August 2015 has provided Chinese soda ash producers with an additional price advantage. Together the VAT rebate and currency devaluation give Chinese soda ash exporters a $27 per metric ton benefit based on an average export price of $200 per metric ton. This equates to approximately $60 million in benefit for Chinese exporters.

Recent media reports, as you've cited, indicate that China is considering a further 15 to 20 percent devaluation of its currency by the end of 2016. China has reduced export prices by $30 to $40 per metric ton in the past six months. Chinese soda ash exporters are now prime to take market share from the U.S. throughout Asia and beyond.

China competes directly with U.S. natural soda ash in Asian markets where U.S. exports have grown in recent years. Unfortunately, China enjoys preferential access to markets such as Vietnam, Taiwan, Pakistan and the Philippines. U.S. natural soda ash faces tariffs in all these countries, but China has none due to regional free trade agreements. Adding to industry concerns is the fact that demand for soda ash has weakened in key markets in Asia and Latin America.

If China continues to benefit from unfair trade practices, economic growth is stalled in many emerging economies. Glass production, especially for the use in construction in automotive markets, is expected to decline. The consequences are likely to be felt by U.S. soda ash exporters.

The last time there was a decline of U.S. soda ash exports was in 2009, a result of the global recession. At that time, the two-percent royalty rate on soda ash was the key to our competitiveness and helped to ensure that U.S. exports could rebound quickly.

Mr. Chairman, now more than ever a royalty policy that factors in the competitiveness of U.S. soda ash exports is needed. The current convergence of an increasingly aggressive government supported competition from China combined with a weak outlook for foreign demand poses a high risk for U.S. soda ash exports. If we are not careful, a bright spot on the U.S. economy, the $1.3 billion soda ash trade surplus, is in jeopardy.

Thank you very much for the opportunity to provide our views and we urge your support of S. 2031.

[The prepared statement of Mr. Douville follows:]

Testimony of Mr. Christopher B. Douville

President, American Natural Soda Ash Corporation (ANSAC)

On S. 2031, "The American Soda Ash Competitiveness Act"

Before the Subcommittee on Public Lands, Forests and Mining of the Senate Energy and Natural Resources Committee

October 1, 2015

Christopher Douville
President
American Natural Soda Ash Corporation (ANSAC)

Introduction

Chairman Barrasso, Ranking Member Wyden, and Members of the Committee, thank you for the opportunity to testify on S. 2031, the American Soda Ash Competitiveness Act. I am Chris Douville, President of ANSAC, which is the world's largest soda ash exporter.

I join my industry colleagues today in voicing support for this legislation. With U.S. soda ash exports facing the combined headwinds of a shaky global economy and increasingly aggressive foreign competition, a reduction of the royalty rate is needed now more than ever. Without congressional action, U.S. export gains accomplished in recent years will be threatened. The competitiveness of U.S. soda ash is paramount to our export success.

I would like to highlight several issues as you consider this legislation. First, the U.S. soda ash industry – thanks in part to previous royalty reductions – has increasingly expanded exports from 4.5 million metric tons in 2005 to 6.7 million metric tons in 2014, reducing the U.S. trade deficit by more than $1 billion in recent years. In fact, over the past ten years, soda ash export volumes have increased every year except 2009. Second, U.S. natural soda ash is facing growing competition in developing countries from China's synthetic soda ash. As the Chinese economy has slowed, its domestic consumption of soda ash has reduced, thereby putting pressure on Asian export markets as Chinese government policies promote both excess production capacity and increased exports. Third, the outlook for exports is expected to worsen in the year ahead, as global soda ash demand growth, largely tied to construction, automobile sales, and consumer confidence in emerging markets, is in decline.

Without the passage of this legislation, the challenges facing U.S. natural soda ash exports would only be worsened by a higher royalty rate. From the perspective of ANSAC, enactment of this legislation is absolutely critical to maintain U.S. jobs and export competitiveness.

Soda Ash: A U.S. Export Success Story

ANSAC was established in 1984 as the export arm of the U.S. natural soda ash industry. Our vision is to be the most efficient, sustainable and reliable global soda ash supplier through continuous innovation. ANSAC operations involve the sales, marketing, and logistics in global export territories for three leading producers of natural soda ash in the United States: Tronox, Tata Chemicals and OCI. Soda ash is a basic chemical commodity used in the manufacture of glass and detergents.

Over its history, ANSAC has succeeded in expanding U.S. natural soda ash exports in markets around the world. Since the federal royalty rate for soda ash was lowered in 2006, U.S. natural soda ash exports have reached their highest levels in history. At quantities of 6.7 million metric tons valued at $1.3 billion in 2014, U.S. natural soda ash exports have directly contributed

Christopher Douville
President
American Natural Soda Ash Corporation (ANSAC)

to thousands of high-paying U.S. jobs and served to put a dent in the U.S. trade deficit. In 2014, 58 percent of U.S. natural soda ash production was exported, compared to 42 percent in 2005, the year before the royalty rate was first reduced. Thus, the royalty rate reduction has greatly helped to support additional export growth.

The U.S. is not only the leading soda ash exporter in the world; it is also the most efficient and environmentally friendly. U.S. natural soda ash consumes far less energy and produces fewer greenhouse gas (GHG) emissions than synthetic soda ash produced in China or Europe. When compared to the synthetic process in China, U.S. natural soda ash consumes 50 percent less total energy per ton of soda ash produced and has a lower greenhouse gas-delivered footprint to its global customers despite significant transport miles.

A recent development in Vietnam demonstrates the environmental consequences of applying barriers to U.S. soda ash. In 2014, Vietnam applied a new 2 percent tariff on U.S. soda ash in an effort to help promote the start up a new domestic soda ash plant. When this plant came on-line in June 2015, its production occurred without any environmental controls, causing a mass fish kill and excessive air pollution. According to multiple media reports, it has become such a public health hazard that authorities have suggested relocating local households.

China: The Growing Competitive Threat

Despite the efficiency and environmental advantages of U.S. natural soda ash production, China has overtaken the United States as the world's largest soda ash producer, manufacturing more than 25 million metric tons of soda ash in 2014. China now produces 115 percent more soda ash than the United States. While most of this production has been directed to domestic consumption, the percentage of Chinese soda ash exports is on the rise.

We forecast that Chinese exports could increase 22 percent to 2.2 million metric tons in 2015 versus 2014 levels. At the same time, domestic demand growth has fallen to its lowest level in China since 2009. Looking back to that recession year, declining domestic demand pushed the Chinese producers to secure increased export share in a shrinking global soda ash market. Therefore, in 2009, while the global recession caused U.S. producers to lose almost 1 million metric tons of export business, Chinese exports grew by almost 200,000 metric tons with increased government support including the April 1, 2009 establishment of a 9 percent value-added tax (VAT) rebate for soda ash exports. In 2015, we are experiencing a potential similar export growth scenario in which a declining domestic soda ash demand as well as a decline in demand for all products from China has prioritized export promotion by the Chinese government on all products, including soda ash.

As mentioned previously, since 2009, China has promoted the export of soda ash by offering its producers a 9 percent rebate of the country's 17 percent VAT on their exports. Based

Christopher Douville
President
American Natural Soda Ash Corporation (ANSAC)

on an average price of $200 per metric ton, this rebate provides an estimated $18 per metric ton benefit for Chinese exports. More recently, the government's 4.4 percent devaluation of China's currency in August 2015 provides Chinese soda ash producers with an additional price advantage over U.S. soda ash. The combination of the VAT rebate and the currency devaluation gives Chinese soda ash exporters a $27 per metric ton benefit based on the same average export price of $200 per metric ton. At the projected 2.2 million MT of exports in 2015, these policies equate to approximately $60 million in benefits for Chinese exporters.

Recent media reports indicate that China is considering a further 15-20 percent devaluation of its currency by the end of 2016, which would provide an even greater advantage to its soda ash exporters as each 1-percent devaluation equates to approximately $2/MT in benefit to China soda ash exporters.

Recent changes in China's export tax policies on ammonium chloride fertilizer, which is a by-product of synthetic soda ash production, have caused a $30-40 per metric ton by-product credit profit improvement for Chinese synthetic soda ash producers over the past six months. In addition, lower global energy costs have been especially beneficial for Chinese producers given their dependence on less-efficient fossil fuels. As a result of these and other cost reductions, Chinese producers' profitability has increased dramatically while its export prices are trending down.

China competes directly with U.S. natural soda ash in Asian markets where U.S. exports have grown in recent years. Unfortunately, China enjoys preferential access to markets such as Vietnam, Taiwan, Pakistan, and the Philippines, which are all countries where U.S. natural soda ash faces tariffs but China has none due to regional free trade agreements. China's pending free trade agreements (FTAs) with Australia, South Korea and Japan would give its soda ash producers even greater market access in the region. Therefore, ANSAC has supported passage of the Trans-Pacific Partnership (TPP) trade agreement which would remove import duties of 2 percent and 3.3 percent into Vietnam and Japan, respectively.

As previously mentioned, China's domestic demand situation has also encouraged exports. Demand for soda ash in China fell 10 percent in the second quarter of 2015. With current excess annual production capacity of 5-6 million metric tons, China has reduced export prices by $30-40 per metric ton in the past six months. Trends in China's economy and its industry's favorable cost position have primed Chinese soda ash exports to take market share from the U.S. throughout Asia and beyond. This trend will be accelerated if the costs to U.S. soda ash producers go up, thereby further supporting the need for the enactment of this legislation.

Christopher Douville
President
American Natural Soda Ash Corporation (ANSAC)

Uncertainty: Foreign Demand Challenges Ahead

Adding to industry concerns is the fact that demand for soda ash is weakening in key markets in Asia and Latin America. As economic growth stalls in many emerging economies, glass production – especially for use in the construction and automotive markets – is expected to decline. The consequences of a slowing global economy are likely to be felt by U.S. soda ash exporters. As indicated earlier, the last time there was a decline in U.S. soda ash exports was in 2009, a result of the global recession. At that time, the two percent royalty rate on soda ash was key to our competiveness and helped to ensure that U.S. exports could rebound quickly, as experienced in 2010, when approximately 1 million metric tons of U.S. soda ash exports were added.

As we enter into a period of heightened economic uncertainty – if not recession – in many foreign markets, this is not the time to be increasing costs for U.S. soda ash producers.

Conclusion

ANSAC has been raising concerns about trade-distorting incentives provided to U.S. competitors and international trade barriers to U.S. natural soda ash exports for many years. The problem of China's VAT rebate is not new. Nor is the tariff disadvantage U.S. exporters face in many foreign markets due to the proliferation of international free trade agreements. Rather, the current convergence of increasingly aggressive, government-supported competition from China combined with a weak outlook for foreign demand poses a high risk for U.S. soda ash exports. If we are not careful, a bright spot in the U.S. economy – the $1.3 billion soda ash trade surplus – is in jeopardy.

Mr. Chairman, now, more than ever, a royalty policy that factors in the competitiveness of U.S. soda ash exports is needed. For these reasons, ANSAC strongly urges your support for S. 2031, the American Soda Ash Competitiveness Act. Thank you, Mr. Chairman, for the opportunity to provide our views.

Senator BARRASSO. Thank you very much, Mr. Douville.
Mr. Finn?

STATEMENT OF RICK FINN, FEDERAL AFFAIRS MANAGER, PORT OF PORTLAND (OREGON)

Mr. FINN. Thank you, Mr. Chairman. The Port of Portland appreciates this opportunity to express our support for S. 2031, the American Soda Ash Competitiveness Act.

The Port of Portland is a consolidated public port authority in Portland, Oregon that owns and operates marine, aviation and industrial park facilities. Our marine assets consist of four marine terminals on the Willamette and Columbia Rivers and a large pipeline dredge. In addition, the Port owns and operates Portland International Airport, two general aviation airports and several industrial parks.

Together with several other ports on the Columbia Snake River navigation system, the Port of Portland is an export gateway for products from the Pacific Northwest and the interior of Canada and the United States. Agricultural products and mineral products dominate our export trade. And one of the most important mineral products that we export is soda ash.

The Port of Portland has been exporting soda ash since 1987 when we built a marine terminal dedicated exclusively to the handling of this cargo.

In 2014, 75 ships or about one ship every five days docked at the Port of Portland to load soda ash. We exported about 2.8 million short tons of the product, primarily to Pacific Rim countries. In fact, about 40 percent of all soda ash exports from the United States whether exported by marine or by land go through the Port of Portland, so it obviously comprises a very important cargo for us.

All of the activities associated with receiving soda ash at the Port of Portland by rail and then loading on board ships generates significant local economic benefits. We estimate that about 200 direct, indirect and induced jobs are associated with the handling of this cargo. And each of those direct jobs pays an average of $50,400.

I might just add that these are very important blue collar jobs with benefits that are available to a variety of people, some of whom cannot go to college or for whatever reason, choose not to go to college. So it's the very kind of blue collar job that the Portland region has historically tried to support and cultivate.

Another important but unquantifiable benefit from the handling of soda ash in Portland is that it helps to maintain and improve our local, regional, rail network. The Union Pacific railroad transports soda ash from Wyoming to Portland. And the long haul, steady, reliable nature of this business encourages the Union Pacific to invest and improve the regional rail network in Portland. As a result other domestic and international exporters and importers than have nothing at all to do with soda ash benefit from the rail improvements that the Union Pacific makes to facilitate its soda ash business.

So for a variety of reasons, especially the local economic benefits that this cargo provides to Portland, the Port of Portland is happy to join with our colleagues in the U.S. soda ash industry to urge you to support S. 2031.

Thank you, Mr. Chairman.
[The prepared statement of Mr. Finn follows:]

Statement by Rick Finn
Federal Affairs Manager, Port of Portland (Oregon)
Subcommittee on Public Lands, Forests, and Mining
Senate Committee on Energy and Natural Resources
Hearing on S. 2031, the American Soda Ash Competitiveness Act
October 1, 2015

My name is Rick Finn, and I am the Federal Affairs Manager at the Port of Portland in Portland, Oregon. I appreciate the opportunity to express the Port's support of S. 2031, a bill that would set the federal royalty rate on soda ash leases at two percent for five years.

The Port of Portland is a consolidated public port authority that owns and operates aviation, marine, and industrial park facilities. The Port's marine assets consist of four marine terminals on the Willamette and Columbia Rivers and a large pipeline dredge that operates under contract to the U.S. Army Corps of Engineers to maintain the federal navigation channel on the Columbia River. In addition, the Port owns and operates Portland International Airport, two general aviation airports, and several industrial and business parks.

The Port of Portland is linked with other deep-draft and shallow-draft ports to form the Columbia-Willamette-Snake River navigation system—one of the largest and most important commercial waterways in the United States. Each year, about 2,000 ocean-going ships call on ports in this navigation system, carrying about $20 billion in imports and exports. Exports of agricultural and mineral products dominate the trade from the Columbia River, providing a gateway for the distribution of goods from the Pacific Northwest and the interior of the United States and Canada to overseas markets.

Soda ash, principally from the Green River area of Wyoming, is the second largest commodity exported from the Port of Portland in terms of tonnage and the fourth largest as measured by value. To reliably support this export, the Port developed a marine facility dedicated exclusively to handling soda ash in 1987. Over time the Port and Kinder Morgan, which is the private company that manages the soda ash export facility under a long-term lease with the Port, have invested millions of dollars to improve the capability, efficiency, and environmental practices of the terminal. Most recently, Kinder Morgan installed a new state-of-the-art, high-capacity ship loader, and the Port carried out necessary demolition work and maintenance dredging.

During 2014, 75 ships docked in Portland to load 2.8 million short tons of soda ash for export to Pacific Rim countries, as well as Europe, Africa, and South America. In fact, about 40 percent of all U.S. soda ash waterborne exports moves through Terminal 4 at the Port of Portland.

All of the combined activities associated with receiving soda ash by rail and then loading the product onboard ships generate an important local economic benefit. The following statistics illustrate the local economic benefits of exporting soda ash through the Port of Portland:

- About 200 direct, indirect, and induced jobs
- Each direct job pays an average salary of $50,400
- All 200 jobs generate total income of $6.9 million
- $3.8 million in state taxes
- $43.4 million in local purchases of supplies and services

Soda ash exports generate another less quantifiable, but still significant benefit to the Portland region. The Union Pacific Railroad transports soda ash to the Port of Portland, and the railroad values the steady, reliable revenue that is generated by the long-haul shipment of this kind of cargo. Therefore, soda ash shipments from Wyoming to Portland serve as an incentive for the Union Pacific to maintain and improve its rail network in the Portland region. As a result, other international and domestic shippers that move their cargo through Portland benefit from the railroad's investments in its Portland rail network.

As you can see, the Port of Portland and its many stakeholders, including shippers and labor, derive important benefits from the export of soda ash. The Port strongly supports efforts by the U.S. soda ash industry to remain competitive in overseas markets by reducing their production and supply chain costs. In that context, the Port of Portland urges this Subcommittee and the full Energy and Natural Resources Committee to act favorably on S. 2031, the American Soda Ash Competitiveness Act.

Thank you for your consideration of the Port of Portland's views on this matter.

Senator BARRASSO. Thank you very much, Mr. Finn.
Mr. von Ahrens?

STATEMENT OF FRED VON AHRENS, VICE PRESIDENT, MANUFACTURING, TRONOX ALKALI

Mr. VON AHRENS. Thank you.

Good afternoon, Chairman Barrasso. My name is Fred von Ahrens. I'm the Vice President of Manufacturing for Tronox Alkali in Green River, Wyoming. I'm here representing Tronox Alkali and the four other U.S. producers of natural soda ash, Tata Chemicals, OCI, Solvay, Searles Valley Minerals, in support of S. 2031.

I'm pleased to report that the soda ash industry is the country's largest inorganic chemical export by volume contributing more than one billion dollars annually to our trade balance. Combined, the five U.S. natural soda ash producers employ more than 3,000 full time, skilled workers with an average salary of more than $122,000. Approximately 1,000 of these workers are represented by the United Steel Workers.

More than 18,000 indirect jobs are also dependent on the U.S. industry including the railroads, glass packaging, window manufacturing, the auto industry and port workers in Washington State and Oregon, California and Texas. The five companies also have corporate offices in Connecticut, New Jersey, Oklahoma, Pennsylvania and Texas with a staff totaling more than 500 employees.

Recent history has demonstrated that a two-percent Federal royalty rate can have positive impacts. First, it fosters robust export growth consistent with the President's National Export Initiative. Second, it leads to expanded domestic manufacturing capacity and job growth. Third, it results in an increase rather than a decrease in Federal royalty revenues by spurring development of the resource.

Mr. Chairman, today, approximately 58 percent of our production is exported primarily to the Pacific Rim and Latin America. The 2006 and 2013 royalty rates enacted by Congress came out of recognition that global economic conditions, specifically the emergence of subsidized Chinese competition, were eroding America's natural soda ash advantage.

There are two methods of producing soda ash, the natural method, utilizing Trona ore employed by the five U.S. companies, and a synthetic process. China is the largest producer and exporter of the synthetic process. The natural process is the more efficient way of making soda ash and has significant environmental advantages over the synthetic process, which generates a larger carbon footprint and has other negative environmental impacts.

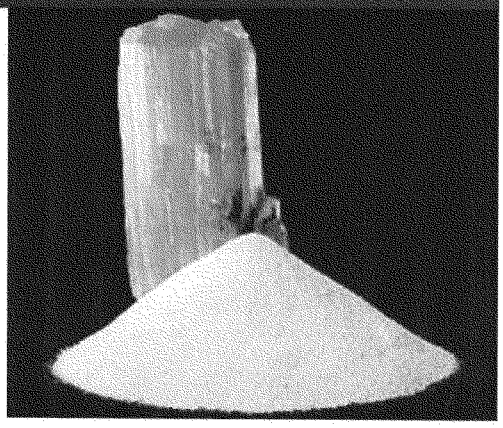
Mr. Chairman, I would like to submit for the record a life cycle assessment commissioned by the IMANA that demonstrates that U.S. soda ash is better for the world than Chinese synthetic soda ash.

Senator BARRASSO. Without objection.

[The information referred to follows:]

SustainableSolutions
CORPORATION

IMA-NA Soda Ash Life Cycle Assessment



Prepared For: Industrial Minerals Association – North America

IMA-NA Industrial Minerals Association North America

OCI

SOLVAY

TATA

TRONOX

Searles Valley Minerals

Life Cycle Assessment
IMA-NA
Soda Ash

May 2015

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If you should receive this report, please contact info@ima-na.org or call (202) 457-0200

Commissioned by IMA-NA

LCA Practitioner:
James Mellentine, LCACP, Sustainable Solutions Corporation
Cara Watson, LCACP, Sustainable Solutions Corporation

Conducted according to ISO 14044 International Standard

Executive Summary

This cradle-to-gate life cycle assessment (LCA) was conducted for soda ash derived from mined trona, a mineral. Soda ash is a widely used industrial chemical in hundreds of products such as glass, detergents, soaps, chemicals, environmental controls, pulp and paper, and water treatment.

Environmental impacts are reported for one metric tonne of soda ash. This work was performed by Sustainable Solutions Corporation and commissioned by the soda ash section of the Industrial Minerals Association of North America (FMC Corporation (now Tronox Alkali), Tata Chemical, OCI Chemical, Solvay, and Searles Valley Minerals). The objective of commissioning this study was to quantify and understand the environmental impacts throughout the cradle-to-gate extraction and production in order to examine opportunities for process improvements and to facilitate science-based communication of environmental impacts to customers, employees, and other stakeholders.

LCA is a rigorous study of the input and outputs at each stage in the life cycle of a product which provides a scientific basis for evaluating the resulting potential environmental impacts. LCA is an alternative to the single-criterion decision-making that currently guides many environmental choices. It enables a deeper understanding of the environmental footprint which benefits manufacturers in improving their product's environmental performance and their manufacturing processes as well as enables consumers to make more informed decisions on products and materials.

Goals

The goals of this study were to:

- Identify and quantify the potential environmental impacts and embodied energy associated with each cradle-to-gate stage in the production of soda ash manufactured at the participating sites in Green River, Wyoming and Searles Valley, California.
- Illustrate how the results from this study compare to the results of other published soda ash inventories (such as synthetically produced and natural soda ash in China).
- Show the relative impacts of various global distribution scenarios.
- Serve as the basis for the publication of relevant environmental literature. The literature will enable communication of environmental performance information to existing and potential customers and other external stakeholders.

Methodology

This study was conducted according to the life cycle inventory (LCI) and life cycle impact assessment (LCIA) standards established by the International Organization for Standardizations (ISO) life cycle assessment standards ISO 14040 series. The geographic boundary for this study is the United States, with global distribution scenarios presented.

For this life cycle assessment, Sustainable Solutions Corporation (SSC) collected specific data on energy and material inputs, wastes, water use, emissions, and transportation impacts from five mining and processing facilities for the calendar year 2013 from five participating soda ash producers. Production data were then used to allocate these inputs and wastes to the functional unit of one metric tonne of soda ash. The National Renewable Energy Lab (NREL) US LCI database and the Ecoinvent database served as the primary sources of secondary life cycle inventory data for all energy, transportation, and raw material processes not directly collected from the mining and processing facilities.

The LCI results were characterized into impact assessment indicator categories using a subset of the US Environmental Protection Agency's (EPA) Tools for the Reduction and Assessment of Chemical and other environmental Impacts (TRACI 2.1) factors as well as cumulative energy demand.

Key Findings

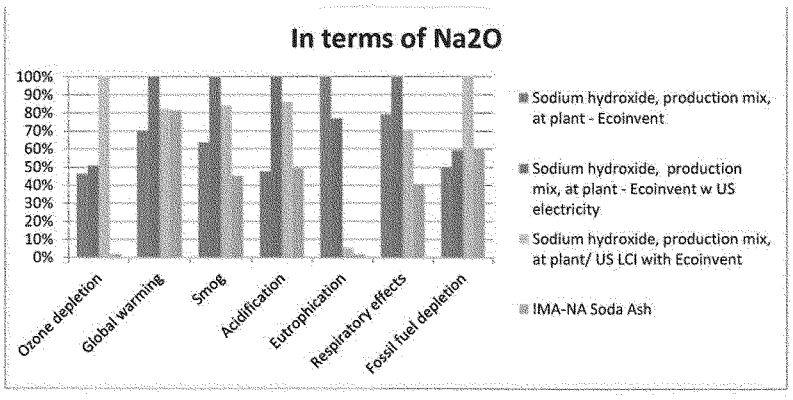
Surface processing of soda ash generally contributes the highest impacts to the cradle-to-gate life cycle of soda ash due to the relatively larger amounts of energy required for the processing. Outside of the surface processing stage, the support materials stage is generally the primary source of environmental impacts, although this has considerable variation and uncertainty.

Depending on the destination, transportation to the customer also has a large impact on the life cycle of soda ash.

The soda ash producers and facilities that participated in this study are the only producers in the United States, and thus the data represents 100% of the soda ash industry for 2013. Therefore these results provide a comprehensive representation of the soda ash industry in the United States. .

Compared to published life cycle inventory data of soda ash produced in China, Chinese natural soda ash and synthetically produced soda ash has higher environmental impact potentials for global warming, smog, acidification, eutrophication, respiratory effects, and cumulative energy demand. The IMA-NA soda ash has higher impacts in ozone depletion and fossil fuel depletion.

To provide relative context as to how soda ash performs environmentally, a comparison to three caustic soda secondary data sets, in relative terms of one metric tonne of Na_2O, is shown below compared to soda ash in relative terms of Na_2O. As the processing of caustic soda is different from natural soda ash, the environmental impacts will be different as well. The Ecoinvent data set is based on average European production of one metric ton (tonne) of sodium hydroxide in a 50% solution, representing a mix of mercury cell (55.1%), diaphragm cell (23.5%), and membrane cell (21.4%) technologies. The second data set uses the Ecoinvent data and replaces electricity and fuels with US data sets to more closely represent conditions in the United States. The third caustic soda data set is from a study conducted by Franklin Associates for one tonne of US sodium hydroxide and entered into the US LCI database, but with gaps later filled in with US-Ecoinvent proxy data.



Recommendations

Soda ash producers should use this life cycle assessment study for the following:

- To better understand the life cycle impacts of soda ash to see how their particular company compares to the US average for energy, water, waste, and emissions.
- R&D personnel at participating companies can use the LCA results as a tool to evaluate lower impact support materials, suppliers, and process design within the physical and chemical constraints of the required product.
- Continue to track energy, water, and waste and evaluate opportunities to reduce consumption and related impacts in mining and surface operations.
- Develop supply chain agreements with suppliers to further reduce impacts from support materials.
- Decrease particulate emissions created during the production process to the surrounding environment.
- Develop literature to communicate the results of this study to external customers and stakeholders. Since soda ash is utilized as an ingredient in many building products this data will be valuable to building product manufacturers for completing LCA and EPD (Environmental Product Declaration) on their products to meet new transparency requirements for Green Building Standards such as LEED.

Critical Review

This assessment has completed a critical review by three experts on life cycle assessment and/or soda ash production. The following have thoroughly reviewed this study for compliance to ISO standards as well as for technology reasonableness.

- Dennis S. Kostick, retired. Formerly Mineral Commodity Specialist for Soda Ash, US Geological Survey
- Lyle Nehls, retired. Former Director of Technology, FMC Alkali Chemicals
- Andrew Swanson, Managing Director, IHS Chemical Consulting

This study was accepted by the study's commissioners. Subsequent publication of results is recommended.

SustainableSolutions CORPORATION

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1.0 Introduction

Life cycle assessment (LCA) is a powerful tool used to quantify the environmental impacts associated with the various stages of a product's life. Section 1 provides a background and overview of LCA methodology and benefits.

1.1 Background

The use of LCA is growing rapidly across several markets such as construction, food, and household goods. The United States soda ash industry recognizes the benefits of communicating credible, science based and transparent environmental information about its product. This report will baseline and benchmark one metric tonne of natural soda ash to assist with measuring and understanding the environmental impacts of soda ash.

1.2 Overview of Life Cycle Assessment

Life Cycle Assessment (LCA)[1] is an analytical tool used to comprehensively quantify and interpret the environmental flows to and from the environment (including emissions to air, water and land, as well as the consumption of energy and other material resources) over the entire life cycle of a product (or process or service). By including the impacts throughout the product life cycle, LCA provides a comprehensive view of the environmental aspects of the product and an accurate picture of the true environmental tradeoffs in product selection.

The standards in the ISO 14040-series set out a four-phase methodology framework for completing an LCA, as shown in Figure 1: (1) goal and scope definition, (2) life cycle inventory (LCI), (3) life cycle impact assessment, and (4) interpretation. An LCA starts with an explicit statement of the goal and scope of the study; the functional unit; the system boundaries; the assumptions, limitations and allocation methods used; and the impact categories chosen. In the inventory analysis, a flow model of the technical system is constructed using data on inputs and outputs. The input and output data needed for the construction of the model are collected (including resources, energy requirements, emissions to air and water, and waste generation for all activities within the system boundaries). Then, the environmental loads of the system are calculated and related to the functional unit, to finalize the flow model. Inventory analysis is followed by impact assessment, where the LCI data are characterized in terms of their potential environmental impact (e.g., acidification, eutrophication and global warming effects). The impact assessment phase of LCA is used to evaluate the significance of potential environmental impacts based on the LCI results. The impact assessment data are interpreted and validated by sensitivity analysis by the LCA practitioner to provide useful data to the group that commissioned the LCA.

[1] This introduction is based on international standards in the ISO-14040 series, *Environmental Management – Life Cycle Assessment.* ISO 14044:200610, Environmental management - Life cycle assessment - requirements and guidelines (ISO 14044:2006); German and English version EN ISO 14044:2006

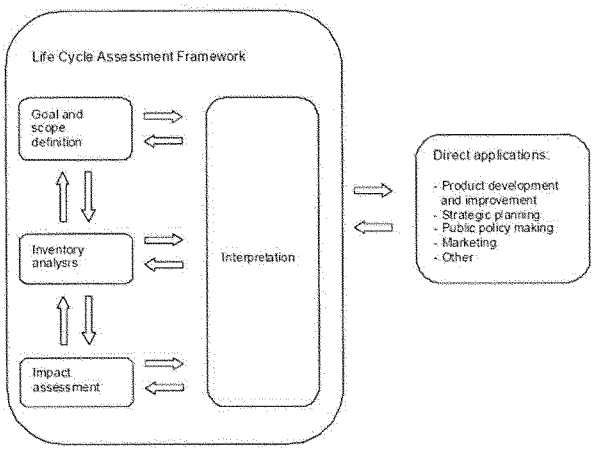

Figure 1.1 – The Four Stages of Life Cycle Assessment

The working procedure of LCA is iterative, as illustrated with the back-and-forth arrows in Figure 1.1. The iteration means that information gathered in a later stage can cause effects in a former stage. When this occurs, the former stage and the following stages have to be reworked, taking into account the new information. Therefore, it is common for an LCA practitioner to work at several stages at the same time.

This LCA study is characterized as a "cradle-to-gate" study, examining the soda ash from its extraction as trona in an underground mine or solution-mined through its processing into a final product and preparation for shipping. The study also examines several domestic and global distribution scenarios to illustrate those relative impacts beyond the facility gate. For this life cycle assessment, Sustainable Solutions Corporation (SSC) collected specific data on energy and material inputs, wastes, water use, emissions, and transportation impacts for the 2013 calendar year from the five soda ash producers and facilities in the United States: FMC Corporation (now Tronox Alkali), OCI Chemical Corporation, Solvay, Searles Valley Minerals and Tata Chemicals. Each company operates their own large combination mining and processing facility. Four of the facilities are located in Green River, Wyoming and extract trona via underground mechanical extraction. The fifth facility is located in Searles Valley, California and extracts trona via solution mining.

This LCA was conducted using SimaPro software[2] with the National Renewable Energy Lab (NREL) US LCI database[3] serving as the primary source of life cycle inventory data for electricity and transportation background data sets. The remaining support material ingredients and processes not directly collected from participating members were modeled using various data sets from USLCI and US Ecoinvent[4] databases. In some cases, the US Ecoinvent data represents the European geography and is adapted to US conditions by using US energy models. Soda ash inventory data from the Chinese Life Cycle Database (CLCD)[5] was also obtained to illustrate a comparison to the IMA-NA average soda ash to both Chinese synthetic and natural soda ash. A subset of the TRACI 2.1 impact assessment methodology was used to calculate the environmental impacts in this LCA. TRACI was developed by the US Environmental Protection Agency (EPA) as a tool to assist in impact analysis in Life Cycle Assessments, process design, and pollution prevention. Selected impact categories include:

1. Global Warming Potential
2. Acidification
3. Respiratory Effects
4. Eutrophication
5. Ozone Depletion
6. Smog
7. Fossil Fuel Depletion

Additionally, the Cumulative Energy Demand methodology was used to quantify embodied energy consumed in the cradle-to-gate life cycle of soda ash.

Potential benefits of a life cycle assessment include:

- providing a clear understanding of environmental impacts of a product across its life cycle,
- better materials sourcing,
- process environmental impact reduction,
- education,
- evaluation of support materials,
- impacts to product standards,
- decreased air emissions,
- waste reduction,
- increased recycling,
- reduced water use,
- cost savings,
- among many others.

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[2] SimaPro v8.0.3 Multi user. PRé Consultants. 2013.
[3] US LCI Database for Life Cycle Engineering, National Renewable Energy Laboratory, Lakewood, CO, 2008
[4] ecoinvent v. 2.2. Swiss Centre for Life cycle Inventories. www.ecoinvent.org.
[5] Chinese Life Cycle Database, Sichuan University, China; IKE Environmental Technology CO, Ltd, China, 2009-2011, http://www.itke.com.cn/

2.0 Goal and Scope Definition

The nature of life cycle assessment is to include a wide range of inputs associated with the product being analyzed. Constraining the LCA scope is an essential part of the study. The following section defines the goal, scope, and boundaries of this LCA study.

2.1 Goal of the Study

The goal of this analysis is to identify and quantify the environmental impacts associated with each stage in the cradle-to-gate life cycle of natural soda ash, including mining and processing. Domestic and global distribution scenarios are also analyzed separately. Available inventories and impact assessment results of other soda ash studies are then compared to the results of the United States natural soda ash in the context of the global market.

Intended Uses

LCA is a tool that can effectively be applied for process improvements, education and marketing support, environmental management, and sustainability reporting. Soda ash producers, whom are the primary audience of the study, intend to use the study results mainly for the following purposes:

- Develop an inventory of natural soda ash produced by the participating members of IMA-NA.
- Identify and quantify environmental impacts associated with cradle-to-gate plus distribution stages of soda ash.
- Assess the environmental impact of US soda ash delivered to various locations around the world.
- Analyze and compare distribution destinations.
- Develop a confidential LCA report according to ISO standards, to serve as an input for published material.
- Competitive analysis and positioning in order to analyze and evaluate claims or LCA/EPD information published in the future by competitors.
- Develop a caustic soda comparison, in terms of Na_2O, to provide relative performance of natural soda ash environmental impacts.

Though this detailed report is intended to remain confidential, the results of this study will be used in future summary reports and marketing development for the following purposes:

- As a tool to illustrate environmental impacts to regulatory agencies (state or local environmental agencies or the U.S. EPA) as needed.
- To meet future requirements for green purchasing or public leasing programs for the Unites States Government, corporations, or other businesses.
- To provide soda ash environmental impact data for input to other studies which examine the products which soda ash is used to produce

2.2 Product Description

Soda ash is a trade name for the chemical sodium carbonate (Na_2CO_3). In its final form, soda ash is a white, dry, powder/granular material that is mildly hygroscopic, and is highly alkaline. It is used as a raw material in numerous diverse products such as glass, detergents, soaps, chemicals, environmental controls, pulp and paper, and water treatment.

Natural soda ash is mined as the mineral trona, which is processed and refined into the final soda ash product.

2.3 Declared Unit

All flows to and from the environment within the system boundary (see Section 2.4 below) are normalized to a unit summarizing the function of the system. Since soda ash has numerous uses and applications, this is a cradle-to-gate study with a declared unit of one metric tonne of finished soda ash, including both light and dense grades. The shelf life of soda ash is dependent upon the storage of the product; however, when stored in a low moisture environment, soda ash has an infinite shelf life. In high humidity environments, it is recommended that free flowing granular soda ash be consumed weekly as soda ash is hygroscopic and may absorb moisture from the air resulting in chunking and flow resistance. As customers purchase soda ash in bulk form by mass, this declared unit is consistent with the goal and scope of the study. The declared unit provides a unit of analysis and comparison for environmental impacts. Downstream customers that use soda ash for specific products and elect to conduct their own LCA studies may use an appropriate functional unit that considers the function of the product, including gate-to-grave stages such as distribution, installation, use & maintenance, and end of life effects. The cradle-to-gate results of this soda ash study would be used as in input to the LCA of the downstream product.

2.4 System Boundary

Soda ash is a commodity product, used as an input into a variety of applications and processes. Because of the diversity of applications, this project considers the cradle-to-gate life cycle activities for trona extraction and soda ash production. Figure 2.1 defines the system boundary of the soda ash. The study system boundary includes the transportation of support material inputs to each life cycle stage. Distribution of the soda ash is separately analyzed for several scenarios to provide additional information for customers purchasing soda ash around the globe. Distribution analysis can allow for competitive positioning and understanding for potential customers as well as provide a true "cost" of the product and of alternative selections.

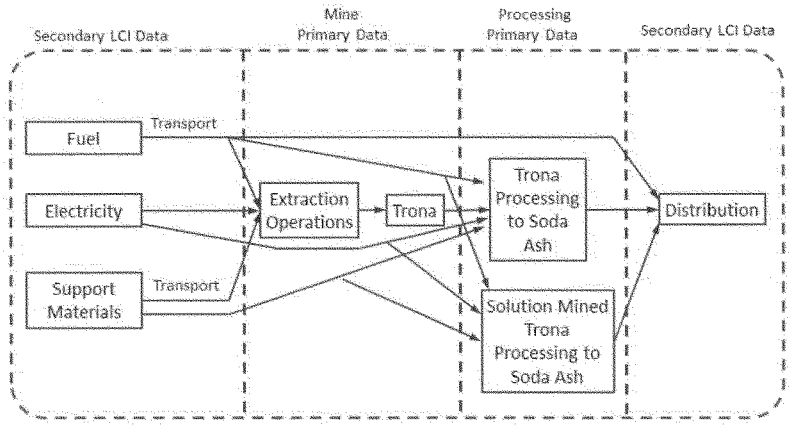

Figure 2.1 – System Boundary for Soda Ash

Any purchased fuels and electricity are included in the system boundary. The extraction, processing and delivery of purchased primary fuels (e.g. natural gas) and primary fuels used to generate purchased electricity (e.g. coal), are also included within the boundaries of the system. Purchased electricity consumed at the various site locations is modeled based on regional grid averages, using the EPA eGrid[6] models published in the NREL US LCI database. The regional grid used for this study is the Western Electricity Coordinating Council (WECC). This region is shown in Figure 2.2. The generation resource mix of the WECC eGrid is 30% coal, 30% natural gas, 22% hydropower, 10% nuclear, 3% wind, 2% geothermal, 1% biomass, and minor amounts of oil, other fossil fuels, solar, and unknown fuels.

[6] EPA Clean Energy eGrid http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html

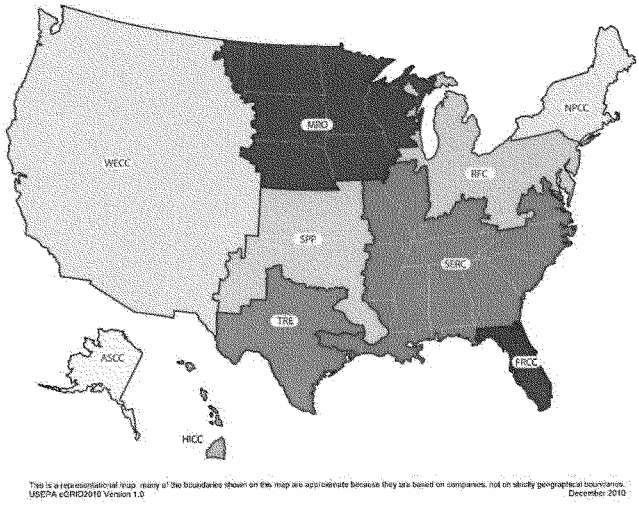

Figure 2.2 – Map of EPA eGrid Electricity Regions

Note that each of the five soda ash producers that participated in this study is obligated to rehabilitate the land which is used for extraction and processing of the soda ash once the mine is depleted and mining activities cease. Examples of land rehabilitation may include contouring of waste piles, covering of land and evaporation ponds with soil to protect from erosion and exposure to precipitation, and planting of vegetation. This rehabilitation is regulated by the state and/or federal governments and ensured through the posting of reclamation bonds. Though this activity will no doubt have an impact on the environment, its occurrence will likely be decades (or more) in the future and thus subject to considerable uncertainty. According to the USGS Mineral Commodity Summary, there are 23 Billion metric tonnes of soda ash reserves[8]. To make even a 1% change to the life cycle carbon footprint (as an example), the rehabilitation global warming impact would have to be 1% x 0.94 tonnes CO_2 eq./tonne soda ash x 23 Billion tonnes soda ash = 216 Million tonnes CO_2 eq. That is over 3 times the entire annual carbon footprint of the state of Wyoming[7]. Given that the rehabilitation footprint would likely be much less than that, it wouldn't have a significant impact on the LCA result. Even if the dry mineable portion of the reserves is much less than 23 Billion tonnes, the calculation is too uncertain to include and the reclamation

[7] US Energy Information Administration. Wyoming State Energy Profile. http://www.eia.gov/state/print.cfm?sid=WY. Last Updated August 21, 2014. Accessed May 1, 2015.

impact is generally expected to be very small on a per ton of soda ash basis. Therefore, future land rehabilitation activity was excluded from the boundary of this study.

Both human activity and capital equipment were excluded from the system boundary. The environmental effects of manufacturing and installing capital equipment and buildings have generally been shown to be minor relative to the throughput of materials and components over the useful lives of the buildings and equipment. Human activity involved in the mining and processing of soda ash no doubt has a burden on the environment; however, the data collection required to properly quantify human involvement is particularly complicated, and allocating such flows to the production of soda ash, as opposed to other societal activities, was not feasible for a study of this nature. Typically, human activity is only considered within the system boundary when value-added judgments or substituting capital for labor decisions are considered to be within the scope of the study; however, these types of decisions are outside this study's goal and scope. The details of the data excluded from the system boundary can be found in the subsequent inventory sections.

Table 2.1 – System Boundary Description

Included	Excluded
Support materials Transport of support materials Energy used (process, lighting, heating, cooling, etc.) at mine and processing facilities Packaging Manufacturing waste and emissions Product distribution (analyzed separately)	Construction of capital equipment Maintenance of operation and support equipment Human labor and employee commute Site rehabilitation following completion of mining activity

2.4.1 Cut-off Criteria

Processes whose total contribution to the final result, with respect to their mass and in relation to all considered impact categories, is less than 1% can be neglected. The sum of the neglected processes may not exceed 5% by mass of the considered impact categories. For that a documented assumption is admissible.

For Hazardous Substances, as defined by the U.S. Occupational Health and Safety Act, the following requirements apply:

- The Life Cycle Inventory (LCI) of hazardous substances will be included, if the inventory is available.
- If the LCI for a hazardous substance is not available, the substance will appear as an input in the LCI of the product, if its mass represents more than 0.1% of the product composition.
- If the LCI of a hazardous substance is approximated by modeling another substance, documentation will be provided.

This LCA is in compliance with the cut-off criteria since no known processes were neglected or excluded from this analysis outside of the specific items listed under "Excluded" in Table 2.1.

3.0 Data Sources and Modeling Software

The quality of results of an LCA study is directly dependent on the quality of input data used in the model. This section describes the data quality guidelines used in this study, the sources from which the data was selected, the software used to model the environmental impacts, and any data excluded from the scope of the study.

3.1 Data Quality

Wherever secondary data is used, the study adopts critically reviewed data for consistency, precision, and reproducibility to limit uncertainty. The data sources used are complete and representative of the United States in terms of the geographic and technological coverage and are a recent vintage (i.e. less than ten years old). Any deviations from these initial data quality requirements for secondary data are documented in the report.

The results of an LCA are only as good as the quality of input data used. Important data quality factors include precision (measured, calculated or estimated), completeness (e.g., unreported emissions or excluded flows), consistency (uniformity of the applied methodology throughout the study), and reproducibility (ability for another researcher to reproduce the results based on the methodological information provided). The primary data from the producers was from the latest calendar year data available. Other datasets used were taken from SimaPro databases, either US LCI or US Ecoinvent. These databases are widely distributed and referenced within the LCA community and are either partially or fully critically reviewed. Secondary data from Chinese soda ash producers was obtained from the CLCD database, which uses a process modeling approach and has been reviewed to comply with ISO 14040 standards.

Time-Related Coverage

The primary data was collected from the IMA-NA members for the latest full calendar year of data, 2013. All other secondary data processes were based on data less than ten years old.

Geographical Coverage

The primary data collected covers all five production facilities throughout the United States. The region-specific electricity grid inventory for each facility was used. The inventory data were chosen to represent the United States, but when data from the US were not available, the inventory models were adapted to US conditions.

Technology Coverage

Whenever possible, the inventory process with the most recent and applicable technology was chosen for the soda ash LCA model.

Precision

The materials, energy, water, waste, packaging, and transport distance data was collected directly from the participating member companies, and the allocation was based on mass produced at each facility. A weighted average was used to average each facility's data for the overall industry impacts. Therefore the precision for primary data is considered high; however the uncertainty of the primary data has not been quantified.

Secondary data sets were used for support materials extraction and processing, transportation, and energy production flows. Since the inventory flows for Ecoinvent processes are very often

accompanied by a series of data quality ratings, a general indication of precision can be inferred. Using these ratings, the data sets used generally have medium-to-high quality. Precision for the datasets used from the US LCI database was not formally quantified. However, many data sets from the US LCI were developed based on well-documented industry averages with data quality indicators provided for each flow.

Completeness

The processes modeled represent the specific situations in the natural soda ash life cycle. System boundaries and exclusions are clearly defined in the sections above, and no other data gaps were identified. For each dataset and material process, however, there are limitations as some processes are missing for some of the products available in this LCI database, creating an issue with respect to completeness. If data gaps were identified, a reasonable proxy was chosen or an alternative database was selected for the model.

Representativeness

The representativeness of the datasets is chosen to be representative of the United States, average technologies of the major producers and distributors and of recent and modern vintage. When the most representative model was not available, a proxy was chosen to reasonably estimate comparable environmental flows.

Consistency

Primary data was collected from participating member companies, in most if not all cases tracked by automated systems and records. Since much of the data is tracked and reported internally on an annual basis, the consistency is considered high. Natural soda ash is a commodity product with a stable market, with an average annual growth of 2.3% in soda ash production between 2010 and 2014, with no major changes in technology, fuels, or material inputs[8]. Therefore, 2013 production data is believed to be representative and consistent for 2010 through 2014. Secondary data was consistently modeled using either US LCI or US Ecoinvent databases as available. Proxies were only identified and used if secondary data was not available in these or other databases. This methodology provides consistency throughout the model.

Reproducibility

Most datasets are from nationally accepted and publicly available databases, ensuring reproducibility by an average practitioner. The industry average life cycle inventory is presented in this report and would allow reproducibility of results. Confidential data from the individual plants would inhibit reproducing the industry average inventory without access to the data.

Data Sources

[8] US Geological Survey, Mineral Commodity Summaries – Soda Ash. http://minerals.usgs.gov/minerals/pubs/commodity/soda_ash/mcs-2015-sodaa.pdf. January 2015. Accessed May 1, 2015.

Most datasets are from widely accepted and critically reviewed databases that are commonly used and accepted in the LCA community. Section 3.2 details each data source in depth.

Uncertainty

Most of the secondary data sets in US LCI and US Ecoinvent databases have some uncertainty information documented and varies per model. Uncertainty for primary data was not quantified. However, the collected data and allocation methodologies were judged by the operations personnel to be accurate, so the uncertainty is considered low.

The primary data from the producers was from the latest data available, incorporating the most recent updates to the process into the model. Other datasets used were taken from SimaPro databases, either US LCI or US Ecoinvent. These databases are widely distributed and referenced within the LCA community. The datasets use relevant yearly averages of primary industry data or primary information sources of the manufacturer and technologies. The uncertainty of each dataset is not formally quantitatively known. Each dataset is from publicly available databases, ensuring reproducibility. The representativeness of the datasets is chosen to be representative of the United States average technologies of the major producers and distributors and of recent and modern vintage. Below is a more detailed description of the datasets used in the model of support materials extraction and processing for the major support material inputs for soda ash extraction and processing.

3.2 Data Sources

The United States is considered the geographic boundary of this study. The reference year is 2013 since the primary soda ash extraction and processing data from the participating producers were collected for that calendar year. Both primary and secondary LCI and metadata are used throughout the study. Metadata refers to the corresponding documentation about each data set, such as methodology, technology, geography, time period, author, etc. All secondary data is taken from life cycle databases. The US LCI database (www.nrel.gov/lci) is frequently used in this analysis. Much of the LCI data residing in the US LCI database pertain to common fuels – their combustion in utility, stationary and mobile equipment inclusive of upstream or pre-combustion effects (i.e. back to earth). Generally, these modular data are of a recent vintage (less than ten years old). This study draws on these data for combustion processes, electricity generation, and transportation on a regional basis. These data are free and publicly available, and thus, offer both a high degree of transparency and an ability to replicate the results of the study; however, there are limitations, as some processes are missing for some of the products available in this LCI database, creating an issue with respect to completeness. If data gaps were identified, a reasonable proxy is chosen or an alternative database was selected for the model.

The Ecoinvent database was also utilized. The original Ecoinvent database is based on European data and contains over 3,500 LCI modules for processes and products, all of which have undergone peer review. The SimaPro provider, EarthShift, created a dataset based on the Ecoinvent database to bridge the gap between European and US regional differences. The basic assumption when using these data is that US and European production processes are generally similar, and European data was adapted for US circumstances (e.g., electricity grids, fuels, and

transportation modes and distances were modified to better reflect US operations). [9] With each Ecoinvent process used in this study, the data had already been adapted to US conditions.

Table 3.1 – Data Sources for Trona Mining Support Materials

Mining Support Material Input	Database(s) and Source[3,4]	Temporal Information	Regional Coverage	Technology Coverage	Data Type
Trona	Sodium carbonate, input from nature, in ground	Direct flow from nature	In ground	Direct flow from nature	Direct flow from nature
Cement	Portland cement, at plant/US LCI	Approximately 2002 - 2004 technology.	United States average	Including quarry and crushing, raw meal preparation, pyro-process and finish grinding.	Secondary
Conveyor System	Based on Ecoinvent model "conveyor belt" adapted to using US LCI processes.	2007	Swiss average, adapted to US conditions	Includes primary materials, transportation of parts to assembly plant, no energy for assembly is assumed	Secondary
Conveyor System: Steel	Steel, low-alloyed, Ecoinvent v3| market for| Alloc Dec, U	2013	Global	Average technology of mostly European companies and their production technologies to make a semi-manufactured product into a final product.	Secondary
Conveyor System: ABS copolymer	Acrylonitrile-butadiene-styrene copolymer resin, at plant/ US LCI	2007	United States	Production from the reaction of acrylonitrile, polybutadiene and styrene.	Secondary
Conveyor System: Portland cement	Portland cement, at plant/US LCI	Approximately 2002 - 2004 technology.	United States average	Including quarry and crushing, raw meal preparation, pyroprocess and finish grinding.	Secondary
Conveyor System: Gravel	Gravel, unspecified, at mine/ US-EI v2.2	2007	Swiss average, adapted to US conditions	Includes the whole manufacturing process, internal processes based on 4 gravel plants.	Secondary
Copper Cable	40% copper, 19% PVC - US LCI, 41% synthetic rubber, at plant/US-EI v2.2	2007	United States average	Medium Voltage Copper Electric Cable, 15kV, 175 mils, shielded	Secondary

[9] EarthShift. US-EI SimaPro Database Update. http://www.earthshift.com/downloads/US-EI_database.pdf

Mining Support Material Input	Database(s) and Source[3,4]	Temporal Information	Regional Coverage	Technology Coverage	Data Type
Fluid emulsion	50% silicone product, 50% tap water/ US-EI v2.2	2007	United States	Mix based on MSDSs	Secondary
HDPE	High density polyethylene resin, at plant / US LCI	2010	United States	UNIPOL gas and slurry process	Secondary
Pipe couplings	Iron and steel, production mix/US LCI	2007	United States average	Included mixing process	Secondary
Polyurethane	40% polyol ether, 60% methylene diphenyl diisocyanate resin, at plant: US LCI	2007	United States	Excluding mixing process, including upstream polyol and MDI production.	Secondary
Steel	Steel, low-alloyed, Ecoinvent v3| market for| Allo Dec, U	2013	Global	Average technology of mostly European companies and their production technologies to make a semi-manufactured product into a final product.	Secondary
Styrofoam	General purposed polystyrene, at plant/ US LCI	2007	United States	Production of general purpose polystyrene from the suspension of styrene monomer.	Secondary

Table 3.2 - Data Sources for Soda Ash Surface Support Materials

Surface Support Material Input	Database(s)and Source[3,4]	Temporal Information	Regional Coverage	Technology Coverage	Data Type
Antifoam	Propylene oxide, at plant/ US LCI	2007	United States	Either chlorohydrin or hydroperoxidation processes using ethylbenzeneisobutene, or MTBE.	Secondary
Biocide	Biocides, for paper production, unspecified, at plant/ US-EI v2.2	2007	Europe, adapted to US conditions	Mixture of two oxidizing agents (chlorine dioxide, hydrogen peroxide) and two highly toxic organics (dithiocarbamate, cyanzin).	Secondary
Activated Carbon	Activated carbon/RER / Agri-footprint, mass	2014	Europe	Wet grinding, creation of briquettes, oxidation, drying, carbonization, activation (of hard coal briquettes treated with steam and CO2), crushing,	Secondary

Surface Support Material Input	Database(s)and Source[3,4]	Temporal Information	Regional Coverage	Technology Coverage	Data Type
				sieving and packaging are included. Transportation of materials is included.	
Coagulant	Proxy: for guar: wheat flour, from dry milling, at plant/BE / Agri-footprint, mass	2014	Belgian	Production of wheat flour, from a wheat dry milling process in Belgium. Consists of several steps including receiving wheat grain, grinding and sieving.	Secondary
Filter aid	Expanded perlite (proxy for diatomaceous earth), at plant/ US-EI v2.2	2004	Europe, adapted to US conditions	Heating of perlite grains to high temperature. Volume increases 15-30 fold.	Secondary
Guar	Proxy: for guar: wheat flour, from dry milling, at plant/BE / Agri-footprint, mass	2014	Belgian	Production of wheat flour, from a wheat dry milling process in Belgium. Consists of several steps including receiving wheat grain, grinding and sieving.	Secondary
Hydraulic Fluids	Diesel, at refinery/US LCI	2007	United States	Average modes and distances for crude oil to US refineries. Refinery data include desalting, distillation and hydro-treating.	Secondary
Hydrochloric Acid	Hydrochloric acid, at plant/ US LCI	2010	United States	1% mercury cell, 99% diaphragm/membrane technology	Secondary
Lime	Ecoinvent	2003	Europe	Average of present used technology.	Secondary
Liquid CO2	Ecoinvent	2003	Europe	Average of present used technology.	Secondary
MEA Corrosion Inhibitor	Proxy: Diethanolamine, at plant/US-EI v2.2	2007	Europe, adapted to US conditions	Production from ethylene oxide and ammonia with a process yield of 95%.	Secondary
Monoethanol amine	Diethanolamine, at plant/US-EI v2.2	2007	Europe, adapted to US conditions	Production from ethylene oxide and ammonia with a process yield of 95%.	Secondary
Nalco Tower Brom 960	92.5% Sodium chloride, 7.5% Sodium perborate, monohydrate / EI-v2.2	2007	Europe, adapted to US conditions	NaCl: 41% solution mining, 59% rock salt; Sodium perborate: production out of borax,	Secondary

Surface Support Material Input	Database(s)and Source[3,4]	Temporal Information	Regional Coverage	Technology Coverage	Data Type
				NaOH and hydrogen peroxide.	
Perlite	Expanded perlite, at plant/ US-EI v2.2	2004	Europe, adapted to US conditions	Heating of perlite grains to high temperature. Volume increases 15-30 fold.	Secondary
Polyalkylene glycol	Proxy: Dipropylene glycol monomethyl ether - Ecoinvent v2.2	2009	Europe, adapted to US conditions	Production from propylene oxide and methanol in Europe.	Secondary
Polypropylene glycol	Propylene oxide, at plant/ US LCI	2007	United States	Either chlorohydrin or hydro-peroxidation processes using ethylbenzene isobutene, or MTBE.	Secondary
Sodium metasilicate	Sodium silicate, US-EI v2.2	2004	Europe, adapted to US conditions	Average technology used from 6 producers.	Secondary
Urea	Urea, as N, at regional storehouse/EI v2.2	2004	Europe, adapted to US conditions	Production of urea from ammonia and carbon dioxide.	Secondary
Oil & Grease	Diesel, at refinery/ US LCI	2008	US average	Refinery data includes desalting, distillation, and hydrotreating operations	Secondary

Table 3.3 - Data Sources for Soda Ash for Processing and Transportation Inputs

Process Input	Database(s)and Source[3,4]	Temporal Information	Regional Coverage	Technology Coverage	Data Type
Electricity, at Grid, WECC	US LCI	2012	Specific eGrid	Region specific electricity grid mix	Primary
Natural Gas	US LCI	2012	United States	LPG combustion in average industrial boiler	Primary
Propane	US LCI	2012	United States	LPG combustion in average industrial boiler	Primary
Coal	US LCI	2012	United States	Coal, 22.7 MJ/kg (19.5 mmbtu/short ton), combustion in average industrial boiler	Primary
Water	Water, lake, input from nature, in ground	Direct flow from nature	In ground	Direct flow from nature	Direct flow from nature
Kerosene	US LCI	2000s Data	United States	Average Technologies	Secondary
Gasoline	US LCI	2000s Data	United States	Average Technologies	Secondary
Diesel	US LCI	2000s Data	United States	Average Technologies	Secondary
Transportation	**Database(s) and Source[3,4]**	**Temporal Information**	**Regional Coverage**	**Technology Coverage**	**Data Type**

Rail	US LCI	2007	United States	Typical	Secondary
Truck	US LCI	2007	United States	Typical	Secondary
Ocean Freighter	US LCI	2000s Data	United States	Average Technologies	Primary

Table 3.4 - Data Sources for End of Life Disposition of Materials

End of Life	Database(s) and Source[3,4]	Temporal Information	Regional Coverage	Technology Coverage	Data Type
Inert to Landfill	US-EcoInvent 2.2	1990s	European - adapted to US Conditions	Average Swiss MSWI plants in 2000 with electrostatic precipitator for fly ash, wet flue gas scrubbed and 29.4% SNCR, 32.3% SCR-high dust, 24.6% SCR-low dust - DeNOx facilities and 13.85% without DeNOx, adapted electricity to US average.	Secondary
Hard coal ash, to landfill	US-EcoInvent 2.2	1990s	European - adapted to US Conditions	Swiss residual material landfill for waste with base seal and leachate collection system. Recultivation after closure.	Secondary
Hazardous Waste Incineration	US-EcoInvent 2.2	1990s	European - adapted to US Conditions	Average Swiss MSWI plants in 2000 with electrostatic precipitator for fly ash, wet flue gas scrubbed and 29.4% SNCR, 32.3% SCR-high dust, 24.6% SCR-low dust - DeNOx facilities and 13.85% without DeNOx, adapted electricity to US average.	Secondary
Tailings disposal	Disposal, non-sulfidic tailings	1990s	European - adapted to US Conditions	Module includes land use and designed for unspecific use for disposal of non-sulfidic tailings in non-ferrous metal extraction. No rehabilitation is assumed.	Secondary

3.3 Modeling Software

SimaPro v8.0 software was utilized for modeling the cradle-to-gate inventory for soda ash. All process data including inputs (support materials, energy, and water) and outputs (emissions, waste water, solid waste, and finished soda ash) are evaluated and modeled to represent each process that contributes to the production of soda ash. The study's geographical and technological coverage has been limited to the United States, SimaPro was used to generate a life cycle impact assessment (LCIA) results utilizing a subset of the TRACI impact assessment methodologies as well as Cumulative Energy Demand. See Section 5.2 for a description of the selected LCIA categories and characterization measures used in this study.

4.0 Life Cycle Inventory

This section describes the cradle-to-gate inventory of the US weighted average soda ash. Primary manufacturing data was collected from surveys completed by personnel from the five producers located in the United States for the 2013 calendar year. 2013 production data is believed to be representative and consistent for 2010 through 2014. The five facilities provided resource transportation mode and distance data to support the calculation of support material transportation flows. Data quality was validated among the five producers for consistency among the industry. Each producer provided data from their facilities that had been allocated to their soda ash production; data related to other products produced at their facility (sodium bicarbonate, borates, caustic soda, etc.) had been pre-allocated by experts at each facility and not provided in this study. The transportation LCI data from the US LCI database (kg-km basis) were used to develop the resource transportation LCI profile.

4.1 Support Materials Overview

The production of soda ash requires many support materials as inputs to both the mining and surface processing operations. For example, a continually expanding underground mine requires steel for tunnel reinforcement, electric cable, water pipe, conveyor system, and others. Surface processing of the trona into soda ash requires materials such as filter aids, defoamers, water treatment chemicals, and others. A thorough accounting of these support material inputs was completed for the inventory of this study. The weighted average material inputs are listed in Table 4.1 and Table 4.2.

Table 4.1 – Trona Mining Support Material Inputs, per Tonne of Trona Ore

Support Material (Mine)	Quantity	Unit	Quantity	Unit
Steel	4.10E-01	lb	1.86E-01	kg
Oil	1.10E-02	gal	2.91E-03	L
Resins	1.10E-01	lb	4.99E-02	kg
Cable	8.20E-03	lb	3.72E-03	kg
0 Polyurethane	5.90E-03	lb	2.68E-03	kg
Mat	2.70E-02	lb	1.22E-02	kg
Fluid Emulsion	1.90E-03	lb	8.62E-04	kg
Pipe Couplings	2.60E-03	lb	1.18E-03	kg
HDPE	2.80E-02	lb	1.27E-02	kg
Conveyor System	4.30E-03	ft	1.31E-03	m
Styrofoam	2.50E-03	lb	1.13E-03	kg

An average of 1.48 tonnes of trona ore are required to produce one tonne of soda ash. This factor is slightly lower than the ratio for dry mining only since solution mining is also accounted in this study. The inventory amounts above were multiplied by this factor when analyzing impacts per tonne of soda ash.

Table 4.2 – Soda Ash Processing Support Material Inputs, per Tonne of Soda Ash

Support Material (Surface)	Weighted Average	Unit	Weighted Average	Unit
Filter Aid (Diatomaceous Earth)	1.32E+00	lb	6.00E-01	kg
Filter Aid (Perlite)	2.43E-01	lb	1.10E-01	kg
Lime	4.52E+01	lb	2.05E+01	kg
Antifoam	5.73E-01	lb	2.60E-01	kg
Guar	9.04E-02	lb	4.10E-02	kg
Coagulant	1.54E-02	lb	7.00E-03	kg
Activated Carbon	4.41E-01	lb	2.00E-01	kg
Urea	1.23E-01	lb	5.60E-02	kg
HCL	7.94E-02	lb	3.60E-02	kg
Water Treatment Chemicals	1.04E-01	lb	4.70E-02	kg
Steel	2.43E-01	lb	1.10E-01	kg
Oil	6.80E-03	gal	1.80E-03	l
Grease	3.80E-03	gal	1.00E-03	l
Other	6.61E-01	lb	3.00E-01	kg

Each support material is shipped to the soda ash production facility. The producers provided supplier information so a distance could be calculated. The average distance, weighted for each facility, is shown in Table 4.3, below.

Table 4.3 – Soda Ash Support Material Average Shipping Distances

Raw Materials Transportation Mode	Distance (tonne-km)
Mining Support Materials	
Truck	0.727
Surface Support Materials	
Rail	0.344
Truck	32.59

The transportation distance is in a weighted average unit of "tonne-km." This unit is used in life cycle assessment for transportation as fuel efficiency is dependent on the load of the vehicle and fuel consumption is dependent on the distance traveled.

4.2 Mining Process Overview

A detailed analysis of the mining processes was completed. A site visit was conducted on March 10, 2014 to the Solvay mine in Green River, Wyoming to observe and understand dry mining and the monohydrate process. On March 11, 2014, a site visit to the FMC (now Tronox Alkali) processing facility was conducted to observe monohydrate and sesquicarbonate processing. A site visit was conducted on March 13, 2014 to the Searles Valley facility in Searles Valley, California to observe and understand the solution mining process.

4.2.1 Dry Mining (Green River, Wyoming)

Dry mining is essentially the mechanical extraction and crushing of underground trona rock which is then conveyed to the surface. One primary method of extraction includes traditional bore miners, which can be thought of as tunneling through the earth. An example of a bore miner is shown in Figure 4.1.

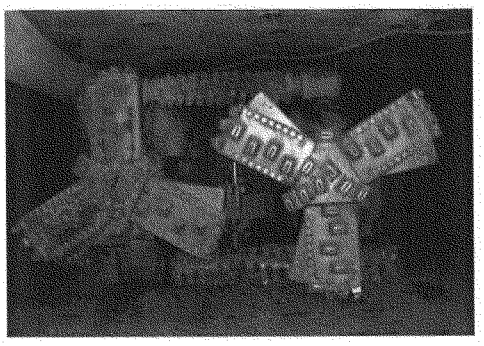

Figure 4.1 – Bore Mining Machine Used for Trona Extraction (Photo: Bureau of Land Management)

Another primary method of extraction uses longwall mining machines. In this method, a machine hundreds of feet long continuously shears the surface rock and laterally advances, while the roof of the mine intentionally collapses behind the machine as it advances through the rock. An example of a longwall miner is shown in Figure 4.2.

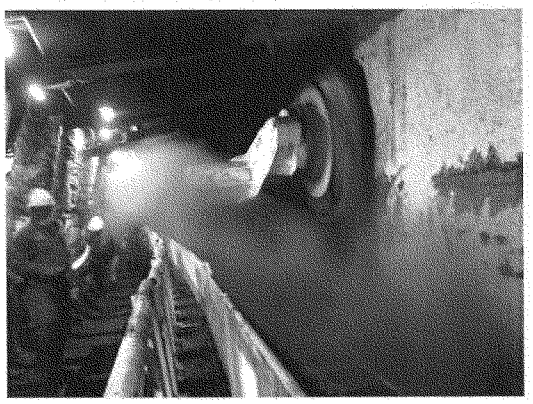

Figure 4.2 – Longwall Mining Machine Used for Trona Extraction (Photo: Wikimedia)

After the trona is extracted as relatively large rocks, it falls onto or is shuttled to a conveyor system which takes it to a mechanical crusher. The rocks are crushed to a smaller size so they can be more easily processed at the surface. The crushed rock continues on the conveyor system to a shaft which uses a vertical skip to haul the trona to the surface, where the trona is dumped onto a large pile to await processing.

The underground mine is continually expanding as more trona is extracted. Infrastructure and resources are continually added to enable the continued extraction. Therefore this infrastructure was included in the scope of the input support materials, in addition to the fuels and electricity used in the extraction and crushing processes.

4.2.2 Solution Mining (Searles Valley, California)

Solution mining is the dissolution of underground trona using liquid brine, which is pumped to the surface, processed, and then returned to the ground to extract more trona. The infrastructure required for solution mining is a traditionally drilled well about 250-310 feet deep, with associated pumps and piping infrastructure. A number of new wells are drilled each year as the amount of trona at the older wells gradually decreases. Steel and cement are required for these wells and were included in the solution mining inventory.

A reasonable amount, approximately 10-15%, of soda ash produced in Green River is also produced by solution mining as described in sections 4.3.3 and 4.3.4 below.

4.2.3 Mining Inventory

Energy, water and waste inputs and outputs were allocated by each participating member company to the dry mining operations that occur at their facility. This inventory was developed per metric tonne of trona basis, and excludes solution mining. Solution mining is included in the surface processing phase of the life cycle.

Table 4.4 - Process Inventory for Mining Operations (per Tonne of Trona Mined)

Energy Input	Weighted Average	Unit	Weighted Average	Unit
Electricity	1.99E+01	kWh	7.15E+01	MJ
Natural Gas	5.56E-02	MCF	6.03E+01	MJ
Diesel	1.40E-02	gal	3.70E-03	l
Gasoline	5.84E-04	gal	1.54E-04	l
Water	**Weighted Average**	**Unit**	**Weighted Average**	**Unit**
Incoming	1.85E+02	gal	4.89E+01	l
Outgoing	2.23E+02	gal	5.89E+01	l
Emissions	**Weighted Average**	**Unit**	**Weighted Average**	**Unit**
Methane	12.50022	lb	5.67E+00	kg
PM_{10}	3.28E-04	lb	1.49E-04	kg
NO_X	6.50E-03	lb	2.95E-03	kg
CO	3.42E-03	lb	1.55E-03	kg
VOC	2.31E-02	lb	1.05E-02	kg
CO_2	1.25E-03	lb	5.66E-04	kg
N_2O	2.95E-04	lb	1.34E-04	kg

4.3 Surface Processing Overview

Once the trona reaches the surface it is processed into soda ash using either of two processes—either the monohydrate process or the sesquicarbonate process.

4.3.1 Monohydrate Process

The monohydrate process is the dominant process for producing soda ash from trona in Green River and is practiced by all the Wyoming producers. The mined ore is screened and crushed, then the crushed ore is calcined using either natural gas or coal fuel to decompose the sodium sesquicarbonate in the trona ore, releasing carbon dioxide and water and leaving anhydrous sodium carbonate and insoluble impurities (basically shale). The calcined trona is dissolved in water where the insoluble material settles out, leaving a sodium carbonate solution which is filtered and sent to multistage evaporative crystallizers. The settled and filtered insolubles are sent to tailings waste ponds. The crystallizers produce soda ash as monohydrate crystals which are recovered in centrifuges and then dried to remove the water, producing granular dense soda ash.

Auxiliary materials used in the monohydrate process include guar gum which improves the settling separation of trona insolubles, filter aid used in filtration, and antifoaming agents and crystal growth modifiers used in the crystallization step. Similar materials are used where appropriate in the other processes described below.

4.3.2 Sesquicarbonate Process

The sesquicarbonate process is practiced by only one producer. In this process the crushed trona is dissolved in water and that solution is settled to remove insolubles and filtered to a clean solution. That solution is then sent to multistage crystallizers where sesquicarbonate crystals are formed. The sesquicarbonate crystals are recovered in centrifuges and sent to a calciner, where water and carbon dioxide are driven off by heat to form medium density granular soda ash. Dense soda ash can be produced by reheating the medium density soda ash to a higher temperature.

4.3.3 Solution mining processes

Several of the US soda ash producers make a portion of their soda ash by dissolving trona in water below the surface, bringing the solution to the surface through wells, and then recovering the sodium carbonate on the surface. As noted above, this report treats the entire process in these cases as surface processing. Where trona (in which the sodium carbonate exists as sodium sesquicarbonate dehydrate) is the source of the sodium carbonate, as is the case for all the US soda ash producers, the brine that is processed into soda ash contains not only sodium carbonate but also some percentage of bicarbonate. To make soda ash, the bicarbonate is changed into carbonate either by stripping the brine with steam, or by reacting the bicarbonate with sodium hydroxide (often made on site by reacting sodium carbonate solution with calcium hydroxide which can be purchased as slaked or quick lime). Once all the bicarbonate has been converted to carbonate the soda ash can be recovered by crystallization as sodium carbonate monohydrate.

Several of the Green River producers practice such solution mining on a significant scale using primarily purchased lime as the reactant to convert the bicarbonate to carbonate. The mine water containing the sodium carbonate and bicarbonate is produced when water or brine is injected into mined out portions of the dry trona mine, so that additional trona can be recovered which would otherwise be left behind. In some cases, the water which is injected carries with it insoluble tailings from the settling process on the surface, thus returning the insoluble waste materials to the mine from whence they came.

4.3.4 ELDM Process

One of the Green River producers has a soda ash production line dedicated to producing soda ash from mine water solution which was prepared by contacting water with trona left behind in the trona mine. This is a patented process, termed ELDM, which entails first evaporating the filtered mine water in a special evaporator equipped with a stripping column which serves to drive carbon dioxide out of the solution as it is concentrated. The evaporated solution then is reacted with sodium hydroxide to eliminate the remaining sodium bicarbonate from the brine. The resulting sodium carbonate solution is crystallized at conditions which produce sodium carbonate decahydrate crystals, leaving behind a solution containing the soluble impurities from the mine water which is disposed of into an evaporation pond. The decahydrate crystals are recovered by centrifugation, re-dissolved in water and sent to an evaporative monohydrate crystallizer. The sodium carbonate monohydrate crystals are recovered by centrifugation and then dried to granular dense soda ash.

4.3.5 Searles Valley Lake Solution Process

The Searles Valley facility recovers trona from shallow mixed salt deposits which include sodium carbonate/bicarbonate minerals. Lake water is injected into the formation and recovered via wells as a saturated brine containing significant amounts of sodium chloride and other salts as well as sodium carbonates. The brine is sent to carbonation towers where carbon dioxide is injected to react with the sodium carbonate to form sodium bicarbonate which is less soluble than the other brine components and crystallizes out of the solution. The sodium bicarbonate is recovered by centrifugation and then calcined, releasing carbon dioxide and forming sodium carbonate. The carbon dioxide from this calcination is recovered and recycled to the carbonation towers. The sodium carbonate is re-dissolved and recrystallized as sodium carbonate monohydrate which, as in the monohydrate process, is recovered and dried to form granular dense soda ash.

4.3.6 Surface Processing Inventory

An inventory was developed for surface processing, including all the solution mining, based on a weighted average of data collected from the five soda ash producers. Table 4.5 includes details of the process inputs and outputs.

Table 4.5 – Surface Process Materials and Fuels Inventory per Tonne of Soda Ash Produced

Energy Inputs	Weighted Average	Unit	Weighted Average	Unit
Electricity	121	kWh	435.6	MJ
Coal	0.165	short tons	0.150	tonnes
Natural Gas	2.05	MCF	2.22E+03	MJ
Propane	3.73E-04	gal	9.85E-05	I
Gasoline	1.63E-02	gal	1.63E-02	I
Diesel	9.33E-02	gal	9.33E-02	I
Water	Weighted Average	Unit	Weighted Average	Unit
Water Inflow	1.09E+03	gallons	1.09E+03	I
Water Outflow	2.36E+02	gallons	2.36E+02	I
Manufacturing Waste	Weighted Average	Unit	Weighted Average	Unit
Hazardous Waste	2.36E-01	lb	1.07E-01	kg
Waste to Landfill	1.28E+02	lb	5.79E+01	kg
Ash	1.49E+01	lb	6.75E+00	kg
Tailings	3.53E+02	lb	1.60E+02	kg
Air Emissions	Weighted Average	Unit	Weighted Average	Unit
PM	6.39E-01	lb	2.90E-01	kg
CO_2	1.25E+03	lb	5.65E+02	kg
CO	1.31E+00	lb	5.92E-01	kg
NO_X	1.48E+00	lb	6.72E-01	kg
SO_X	1.42E+00	lb	6.43E-01	kg
VOCs	6.61E-01	lb	3.00E-01	kg
HAPs	3.70E-02	lb	1.68E-02	kg
CH_4	3.95E-02	lb	1.79E-02	kg
Heavy Metals	1.97E-05	lb	8.93E-06	kg
N_2O	6.11E-03	lb	2.77E-03	kg
Benzene	1.05E-02	lb	4.75E-03	kg
Ethyl Benzene	1.21E-03	lb	5.48E-04	kg
Hexane	3.02E-03	lb	1.37E-03	kg
Styrene	1.81E-03	lb	8.22E-04	kg
Toluene	4.23E-03	lb	1.92E-03	kg
Xylene	5.64E-03	lb	2.56E-03	kg
1,3 Butadiene	7.05E-03	lb	3.20E-03	kg
2-butanone	2.01E-03	lb	9.13E-04	kg
acrolein	6.04E-04	lb	2.74E-04	kg
H_2S	4.87E-04	lb	2.21E-04	kg
H_2SO_4	1.26E-02	lb	5.71E-03	kg
Fluoride	2.16E-03	lb	9.79E-04	kg
Lead	6.92E-06	lb	3.14E-06	kg

4.4 Packaging

The majority of soda ash is shipped in bulk via rail to storage facilities and customers. Producers do offer some packaging for customers. This analysis assumes bulk shipments; however, a sensitivity analysis was conducted for packaging soda ash in bags and super sacks. Based on data collected from one facility, the following table has the material information for the two packaging scenarios.

Table 4.6 - Packaging Assemblies

Packaging Assembly	Soda Ash Quantity	Material
Bags	50 pounds	1 lb Kraft paper (20 kg per tonne)
Super Sacks	500 pounds	7.5 lbs polypropylene (15 kg per tonne)
		1.8 lb polypropylene liner tie (3.6 kg per tonne)

4.5 Storage

Off-site storage also is used by many of the soda ash producers. Energy was collected on a storage facility to demonstrate the environmental impacts of this life cycle stage.

Table 4.7 - Soda Ash Storage Energy Inputs (per tonne of soda ash)

Energy Inputs	Weighted Average	Unit	Weighted Average	Unit
Electricity	0.0421	kWh	0.1516	MJ
Diesel	4.2E-04	gallons	1.11E-04	l

4.6 Distribution

The finished soda ash is shipped throughout the world. Several domestic and global distribution scenarios were separately analyzed to illustrate the transportation impacts for various locations compared to the cradle-to-gate impacts of soda ash. Table 4.8 shows the location scenarios selected along with the transportation distance associated with each location, by mode.

Table 4.8 – Distribution Distances Modeled for Various Global Locations

Shipping Distance	New York, NY	Houston, TX	Seattle, WA	Shanghai, China	Bangkok, Thailand	Santiago, Chile	Frankfurt, Germany	Lagos, Nigeria	Pretoria, South Africa
Rail Distance	2,000 miles (3,219 km)	1,377 miles (2,216 km)	966 miles (1,555 km)	848 miles (1,365 km)	848 miles (1,365 km)	848 miles (1,365 km)	2,000 miles (3,219 km)	2,000 miles (3,219 km)	2,000 miles (3,219 km)
Truck Distance	-	-	-	367 miles (591 km)	50 miles (80 km)	71 miles (114 km)	500 miles (805 km)	50 miles (80 km)	386 miles (621 km)
Ocean Distance	-	-	-	6,551 miles (10,542 km)	8,899 miles (14,322 km)	5,567 miles (8,959 km)	3,974 miles (6,396 km)	5,642 miles (9,080 km)	8,713 miles (14,022 km)

Truck and rail distances were estimated through Google Maps route information; ocean distances were determined through the portworld.com distance calculator from port locations. Return trips for rail cars were accounted for by increasing the overall fuel consumption by 30%[10]. For the transportation analysis, dense soda ash was assumed for each scenario. Light soda ash may differ as ocean freighters may be volume limited instead of weight limited.

5.0 Life Cycle Impact Assessment (LCIA)

The environmental impacts of a product can be categorized and presented in many ways. This section briefly describes the methodology used to develop the impact assessment and defines the selected impact categories used to present the results. This section also lists assumptions of the study and describes the inherent limitations and uncertainty of the LCA results.

5.1 Impact Categories/Impact Assessment

As defined in ISO 14040:2006, "the impact assessment phase of an LCA is aimed at evaluating the significance of potential impacts using the results of the LCI analysis". In the LCIA phase, SSC modeled a set of selected environmental issues referred to as impact categories and used category indicators to aggregate similar resource usage and emissions to explain and summarize LCI results data. These category indicators are intended to "characterize" the relevant environmental flows for each environmental issue category to represent the potential or possible environmental impacts of a product system.

The framework surrounding LCIA includes three steps that convert LCI results to category indicator results. These include the following:

1. Selection of impact categories, category indicators and models.
2. Assignment of the LCI results to the impact categories (classification) – the identification of individual inventory flow results contributing to each selected impact indictor.
3. Calculation of category indicator results (characterization) – the actual calculation of the potential or possible impact of a set of inventory flows identified in the previous classification step.

To maximize the reliability and flexibility of the results, SSC used an established impact methodology for assigning and calculating impacts. A subset of the Tools for Reduction and Assessment of Chemical and other environmental Impacts (TRACI) methodology was used for calculations of environmental impact. TRACI was developed by the US EPA to assist in impact analysis in Life Cycle Assessments, process design, and pollution prevention.

5.2 Selected Impact Categories

While LCI practice holds to a consistent methodology, the LCIA phase is an evolving science and there is no overall generally accepted methodology for calculating all of the impact categories that

[10] Based on data from Solvay, where the rail cars are approximately 30% of the overall rail weight. http://www.solvaychemicals.us/SiteCollectionDocuments/brochures/SA_CustomerManual.pdf

might be included in an LCIA. Typically, the LCIA is completed in isolation of the LCI. The LCI involves the collection of a complete mass and energy balance for each unit process under consideration. LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks. Due to the US focus of this LCA study, a subset of the TRACI LCIA methodology was used to characterize the study's LCI flows. Impact categories include:

1. *Ozone Depletion* (kg CFC-11 eq) – Certain chemicals, when released into the atmosphere, can cause depletion of the stratospheric ozone layer, which protects the Earth and its inhabitants from ultraviolet radiation. This radiation can have a negative impact on crops, materials, and marine life, as well as contributing to cancer and cataracts. This impact measures the releases of those chemicals.
2. *Global Warming Potential* (kg CO_2 eq) – The methodology and science behind the GHG Emissions calculation can be considered one of the most accepted LCIA categories. Because this study also tracks an overall life cycle carbon balance, the carbon dioxide emissions associated with biomass combustion are included in the GHG Emissions calculation, but the sequestering of carbon is treated as a negative emission in the calculation as per the IPCC methodology. Carbon dioxide and other greenhouse gasses are emitted at every stage in the manufacturing process. These gasses can trap heat close to the Earth, contributing to the greenhouse effect.
3. *Smog* (kg O_3 eq) - Under certain climatic conditions, air emissions from industry and transportation can be trapped at ground level where, in the presence of sunlight, they produce photochemical smog, a symptom of photochemical ozone creation potential (POCP). While ozone is not emitted directly, it is a product of interactions of volatile organic compounds (VOCs) and nitrogen oxides (NOx). The smog indicator is expressed as a mass of equivalent ozone (O_3).
4. *Acidification* (kg SO_2 eq) – Acidification is a more regional rather than global impact affecting fresh water and forests as well as human health when high concentrations of SO_2 are attained. Acidification is a result of processes that contribute to increased acidity of water and soil systems. The acidification potential of an air emission is expressed as a mass of SO_2 equivalents.
5. *Eutrophication* (kg N eq) – Eutrophication is the fertilization of surface waters by nutrients that were previously scarce. When a previously scarce or limiting nutrient is added to a water body, it leads to the proliferation of aquatic photosynthetic plant life. This may lead to the water body becoming hypoxic, eventually causing the death of fish and other aquatic life. This impact is expressed on an equivalent mass of nitrogen (N) basis.
6. *Respiratory effects* (kg $PM_{2.5}$ eq) – This impact methodology assesses the impact of increasing concentrations of particulates on human health. Most industrial and transportation processes create emissions of very small particles which can damage lungs and lead to disease and shortened lifespans. This impact is expressed in terms of $PM_{2.5}$ (particulates that are 2.5 microns or less in diameter).
7. *Fossil Fuel Depletion* (MJ surplus) – Maintaining fossil fuel resources for future generations is an essential part of sustainable development. This impact category measures the depletion of those resources in terms of megajoules (MJ). Rather than direct measure of

energy extracted, it is calculated using the difference in energy required to extract replacement fuels and conventional fuels. For example, as oil, gas, and high-grade coals are used, the economy must shift to shale and brown coal deposits, which require more energy to extract an equivalent amount of fuel than conventional oil, gas, and coal. Fossil fuels are used as energy sources as well as raw materials for chemical productions.

While the TRACI methodology supports fossil fuel depletion (on a global scale), it does not readily report primary energy use as an impact category. Primary energy use on a cumulative energy demand (CED) basis is tabulated and summarized as an impact category directly from the LCI flow results. Energy use is a key impact indicator over which soda ash producers are likely to assert a considerable level of control and, therefore, is a good internal target for resource conservation. Cumulative energy demand is the sum of all energy sources drawn directly from the earth, such as natural gas, oil, coal, biomass, or hydropower energy. The CED contains further categories, namely non-renewable and renewable energy, and feedstock energy. Fuel energy values are calculated on a net calorific value, or lower heating value, basis. Human health (cancer and non-cancer) and ecotoxicity impact categories which use the USEtox methodology were excluded from the scope of this analysis due to the large degree of uncertainty in the results. The USEtox developers note that "Interim [characterization factors] might be used in LCA studies, but with great caution and under awareness of their large inherent uncertainty."[11]

5.3 Allocation and Assumptions

Life cycle analysis requires that assumptions are made to constrain the project boundary or model processes when little to no data is available. In this study of soda ash, the following assumptions were made:

- Facility overhead, plant heating, and overhead water use was not separated from the reported data and is therefore included in this study.
- When a material is not available in the available LCI databases, another chemical which has similar manufacturing and environmental impacts may be used as a proxy, representing the actual chemical. The Proxy Chemical List used in this analysis includes:
    - For coagulants and guar gum: wheat flour
    - Diethanolamine was used as a proxy for monoethanol amine

[11] Rosenbaum RK et al; USEtox – the UNEP-SETAC toxicity model: recommended characterization factors for human toxicity and freshwater ecotoxicity in life cycle impact assessment; International Journal of Life Cycle Assessment; September 2008

6.0 Soda Ash LCA Results

This section presents the results of the LCA study. It includes energy, global warming, and other quantified impacts for each of the selected impact categories.

6.1 Mining Impacts

A soda ash producer has the ability to directly influence the mining operations, but no direct control over the manufacturing of purchased support materials. This level of control should be considered when viewing the results of the LCA and identifying areas of improvement.

6.1.1 Mining Energy and Carbon Analysis

Energy is required to extract and crush the trona ore. Table 6.1 lists the weighted average amount of cumulative energy consumed for the mining process. All of the energy consumption was converted to megajoules (MJ) to allow for comparison of energy consumption across all uses. This energy consumption is based on the original inventory in Section 4.2, and excludes Searles Valley Lake Solution processing.

Table 6.1 – Energy Use During the Mining Process (per Tonne of Soda Ash)

Energy Source	Amount (MJ per Tonne Soda Ash)
Electricity	2.4E+02
Natural gas	9.6E+01
Diesel	3.6E+00
Gasoline	1.3E-01
Total	3.4E+02

Figure 6.1 shows the energy breakdown for trona mining. This further illustrates the overwhelming contribution of electricity to the overall energy used to extract trona.

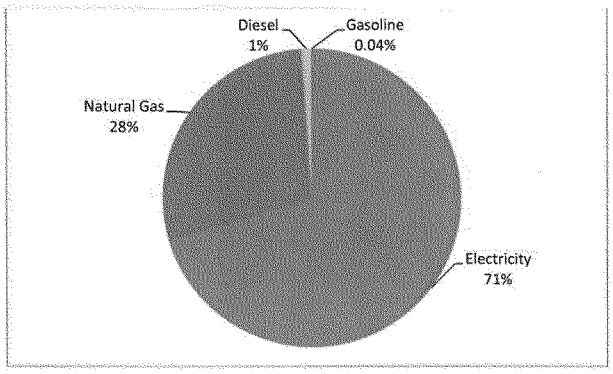

Figure 6.1 - Energy Distribution to Extract Trona

A similar analysis was conducted for the global warming potential. Table 6.2 displays the breakdown of GWP from the average mining of trona ore, excluding Searles Valley Lake Solution processing. Similar to energy use, the majority of GWP in the manufacturing process is from electricity consumption.

Table 6.2 – Global Warming Potential (GWP) from Mining Trona (kg $CO_{2\,eq.}$ per Tonne Soda Ash)

	GWP (kg CO_2eq/ Tonne of Soda Ash)
Electricity	1.6E+01
Natural Gas	9.7E-01
Diesel	2.4E-01
Gasoline	8.1E-03
Emissions	2.1E+02
Total	2.2E+02

Figure 6.2 shows the breakdown of GWP for mining. Unlike cumulative energy demand, this illustrates the overwhelming contribution is from emissions to the overall global warming potential from mining. As some of the mines contain natural gas, the emissions from the mines are driving this impact category. Methane has a global warming potential of 25 kg CO_2 eq per kg of methane released. To mitigate these emissions, often manufacturers may flare the gas to react the methane into carbon dioxide. In some cases, they recover the gas for use as an on-site fuel. Recovering the methane for heat in the process is an avenue that some member companies may wish to increase in the future.

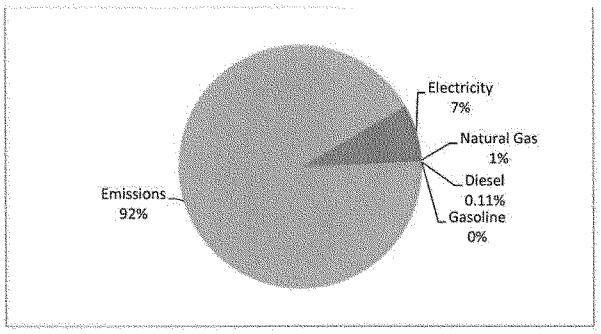

Figure 6.2 - Global Warming Potential (GWP) Distribution from Mining Trona

6.1.2 Additional Environmental Impacts From Mining

Besides energy demand and GHG emissions, mining causes other environmental impacts as well. An impact assessment was completed for the mining. Figure 6.3 shows impacts from mining, per tonne of trona ore. Table 6.3 shows the numerical results.

Table 6.3 –Potential Environmental Impacts of Mining of Trona Ore (per Tonne Soda Ash)

Impact category	Unit	Emissions	Electricity	Natural Gas	Diesel	Gasoline	Total
Ozone Depletion	kg CFC-11 eq	0.0E+00	1.9E-10	2.3E-12	1.0E-11	3.7E-13	**2.1E-10**
Global Warming Potential	kg CO_2 eq	2.1E+02	1.6E+01	9.7E-01	2.4E-01	8.1E-03	**2.2E+02**
Smog	kg O_3 eq	1.6E-01	8.6E-01	1.8E-02	1.1E-01	2.9E-03	**1.1E+00**
Acidification	mol H+ eq	3.0E-03	1.4E-01	4.4E-02	3.4E-03	9.4E-05	**1.9E-01**
Eutrophication	kg N eq	1.9E-04	1.8E-03	2.8E-04	2.0E-04	5.5E-06	**2.4E-03**
Respiratory Effects	kg PM_{10} eq	3.2E-05	7.3E-03	2.7E-03	6.9E-05	1.5E-06	**1.0E-02**
Fossil fuel depletion	MJ surplus	0.0E+00	1.7E+01	1.3E+01	4.7E-01	1.8E-02	**3.0E+01**

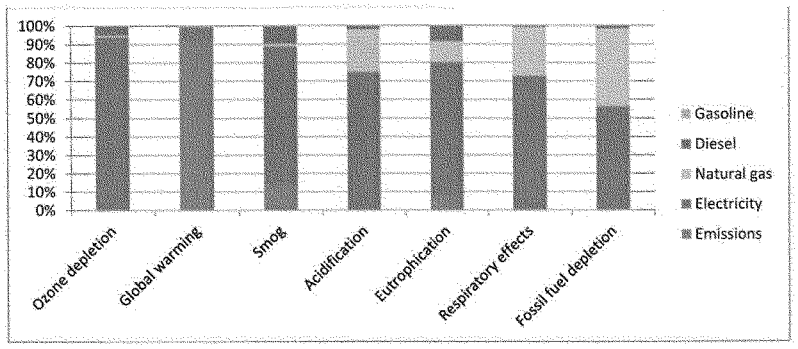

Figure 6.3 – Relative Environmental Impact Analysis of Mining of Trona Ore

As shown in the figure above, the mining impacts are driven by electricity, except for global warming. As electricity is the major source of energy for the mining operations this is expected. For global warming, natural gas emissions from the mine drive the impact category.

6.2 Surface Processing Impacts

A soda ash producer has the ability to directly influence the surface processing operations, but no direct control over the manufacturing of purchased support materials and distribution. This level of control should be considered when viewing the results of the LCA and identifying areas of improvement.

6.2.1 Surface Processing Energy and Carbon Analysis

Energy is required to process trona into soda ash. Table 6.4 lists the weighted average amount of cumulative energy consumed for surface processing and all of the solution mining and processing operations at Searles Lake. All of the energy consumption was converted to megajoules (MJ) to allow for comparison of energy consumption across all uses. This energy consumption is based on the original inventory in Section 4.3.

Table 6.4 – Energy Use During Surface Processing

Source	Cumulative Energy Demand (MJ per Tonne Soda Ash)
Electricity	1.0E+03
Natural Gas	2.4E+03
Diesel	1.3E+01
Gasoline	2.6E+00
Propane	4.1E-02
Coal	4.1E+03
Waste	6.4E+00
Total	**7.6E+03**

Figure 6.4 shows the energy breakdown for soda ash processing. This further illustrates the two main drivers are coal and natural gas to the overall energy used to process soda ash.

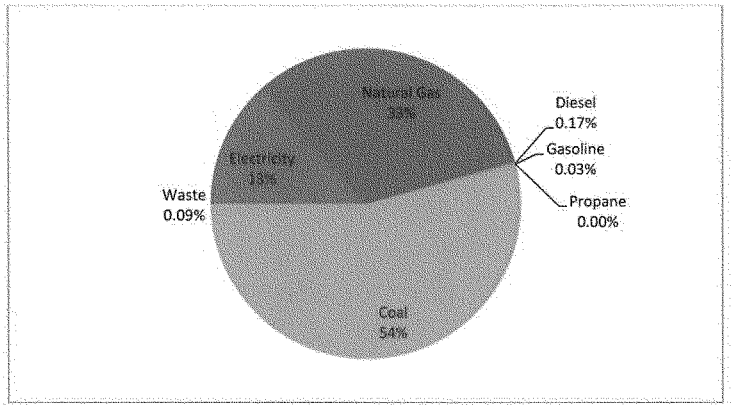

Figure 6.4 – Energy Used to Process Soda Ash (MJ per Tonne Soda Ash)

A similar analysis was conducted for GHG emissions. Table 6.5 displays the breakdown of global warming potential from the average processing of soda ash. The majority of global warming potential in surface processing is from emissions. These emissions include emissions from fuel combustion in addition to carbon dioxide emissions from the process. Trona is decomposed during processing to produce soda ash, which results in carbon dioxide and water as additional products, through the following equation:

$$2(Na_3(CO_3)(HCO_3)\cdot 2H_2O) \rightarrow 3\ Na_2CO_3 + 5\ H_2O + CO_2$$
(trona) (soda ash)
(1.58 tonnes trona → 1 tonne Na_2CO_3 + 0.138 tonnes CO_2)

Table 6.5 – Global Warming Potential from Surface Processing (kg CO_2 eq per Tonne Soda Ash)

Source	Global Warming Potential (kg CO_2eq per Tonne Soda Ash)
Electricity	6.7E+01
Natural Gas	2.5E+01
Diesel	8.9E-01
Gasoline	1.6E-01
Propane	2.9E-03
Coal	2.5E+01
Waste	5.2E-01
Emissions	5.7E+02
Total	6.8E+02

Figure 6.5 show the breakdown of GHG emissions for surface processing. This figure illustrates the overwhelming contribution of emissions to the overall global warming potential from surface processing.

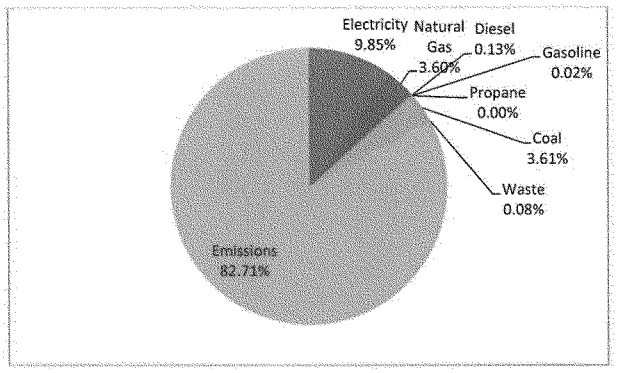

Figure 6.5 – Global Warming Potential from Surface Processing (kg $CO_{2\,eq.}$ per Tonne Soda Ash)

6.2.2 Additional Environmental Impacts from Surface Processing

Besides energy demand and GHG emissions, surface processing causes other environmental impacts as well. An impact assessment was completed for the surface processing phases of soda ash. Figure 6.6 shows impacts from surface processing, per tonne of soda ash. Table 6.6 shows the numerical results.

Table 6.6 - Environmental Impacts of Surface Processing of Soda Ash

Impact Category	Unit (per Tonne Soda Ash)	Emissions	Electricity	Natural Gas	Diesel	Gasoline	Propane	Coal	Fly Ash	Hazardous Waste	Waste to Landfill	Tailings	Total
Ozone Depletion	kg CFC-11 eq	-	8.1E-10	5.9E-11	3.7E-11	7.2E-12	1.1E-13	6.4E-09	3.1E-08	1.5E-08	3.0E-08	-	8.3E-08
Global Warming	kg CO2 eq	5.7E+02	6.7E+01	2.5E+01	8.9E-01	1.6E-01	2.9E-03	2.5E+01	6.4E-02	2.7E-01	1.8E-01	-	6.8E+02
Smog	kg O3 eq	1.8E+01	3.6E+00	4.6E-01	3.9E-01	5.6E-02	1.5E-04	6.7E-01	1.2E-02	5.0E-03	4.3E-02	-	2.3E+01
Acidification	kg SO2 eq	1.1E+00	5.8E-01	1.1E+00	1.2E-02	1.8E-03	7.9E-06	5.8E-02	4.3E-04	4.6E-04	1.5E-03	-	2.9E+00
Eutrophication	kg N eq	3.0E-02	7.4E-03	7.1E-03	7.4E-04	1.1E-04	4.0E-07	1.4E-03	1.3E-02	6.9E-04	2.1E-04	-	6.1E-02
Respiratory effects	kg PM2.5 eq	4.4E-02	3.1E-02	6.8E-02	2.5E-04	2.9E-05	1.7E-07	2.3E-03	4.5E-05	3.4E-05	1.9E-04	-	1.5E-01
Fossil Fuel Depletion	MJ surplus	-	7.2E+01	3.3E+02	1.7E+00	3.4E-01	5.4E-03	4.6E+01	2.7E-01	1.5E-01	3.4E-01	-	4.5E+02

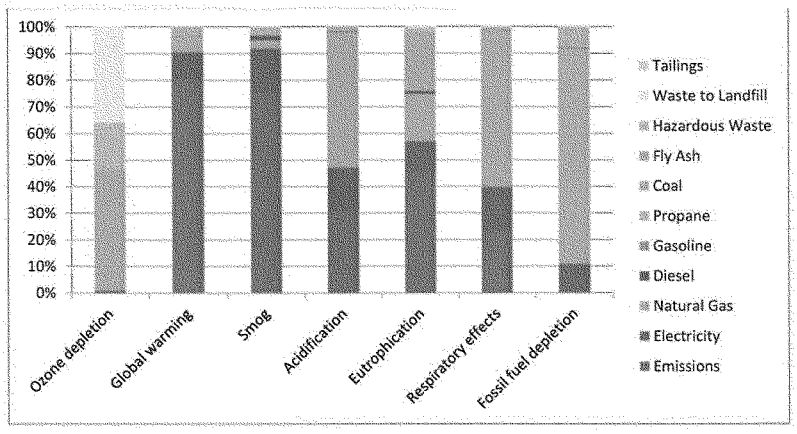

Figure 6.6 – Environmental Impact Analysis of Surface Processing of Soda Ash

As shown in Figure 6.6, the surface processing impacts vary per impact category. Upstream natural gas extraction and production is the largest driver for acidification, respiratory effects, and fossil fuel depletion. Emissions are the largest driver of global warming, smog and eutrophication. The largest drivers of ozone depletion are waste and fly ash disposal.

6.3 Support Material Impacts

In addition to the impacts associated with the mining and processing energy, examining the support materials is another important consideration. Each support material has an associated environmental impact. Figure 6.7 and Figure 6.8 illustrate the environmental impact of each of the support materials used in the mining and processing of soda ash. In order to illustrate these impacts, the selected impact categories were used to assess the impacts of the support materials in the proportions of their weighted average use in the facilities.

Table 6.7 and Figure 6.7 show the impact of the materials used for the mining of trona.

Table 6.7 - Mining Support Materials Impact Assessment (per Tonne of Soda Ash)

Impact Category	Unit	Trona	Fuel Oil	Poly-urethane	Fluid Emulsion	Copper Cable	Pipe Couplings	Styrofoam	HDPE	Conveyor System	Total
Ozone Depletion	kg CFC_{11} eq	0	6.0E-12	2.5E-09	3.0E-09	1.3E-09	2.0E-12	1.4E-13	5.8E-13	1.2E-07	1.4E-07
Global Warming	kg CO_2 eq	0	1.6E-01	2.5E-01	1.3E-03	5.9E-03	1.0E-03	3.1E-03	1.6E-02	2.8E+00	3.7E+00
Smog	kg O3 eq	0	1.1E-02	2.0E-02	6.9E-05	2.7E-04	2.9E-05	1.7E-04	7.2E-04	1.8E-01	2.4E-01
Acidification	kg SO_2 eq	0	7.1E-04	2.8E-03	5.7E-06	3.9E-05	2.8E-06	3.8E-05	3.8E-04	1.5E-02	2.0E-02
Eutrophication	kg N eq	0	2.6E-05	1.0E-04	2.2E-06	9.6E-06	-4.7E-06	6.5E-07	3.8E-06	1.4E-02	1.6E-02
Respiratory Effects	kg $PM_{2.5}$ eq	0	1.1E-05	1.2E-04	4.8E-07	3.2E-06	4.3E-08	2.0E-06	2.2E-05	4.7E-03	5.5E-03
Fossil Fuel Depletion	MJ surplus	0	2.8E-01	1.4E+00	2.7E-03	2.0E-02	4.5E-04	1.4E-02	1.2E-01	1.8E+00	3.9E+00

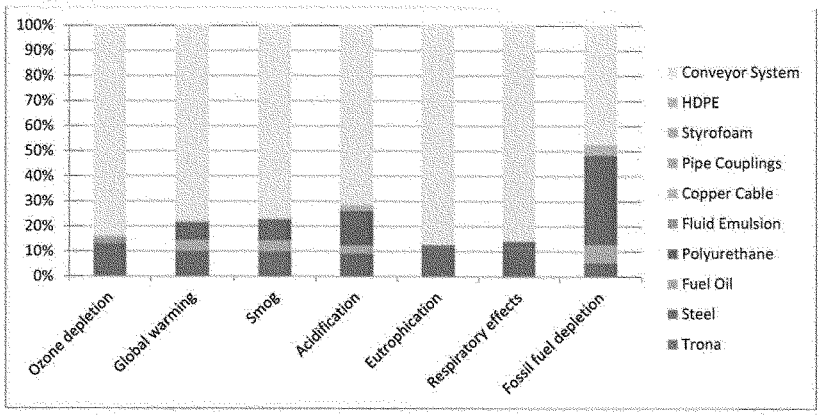

Figure 6.7 - Mining Support Materials Impact Assessment (per Tonne of Soda Ash)

The conveyor system drives the impacts of the support materials in the mining operations. As the conveyor system requires large amounts of steel and other materials, this result makes sense. Steel used for bolts and other mine support is the second largest driver, with resin being the second largest impact category for acidification and fossil fuel depletion.

For the surface processing, support materials are always required to process soda ash. Table 6.8 has the environmental impact results of the support materials required for that stage of the soda ash life cycle.

Table 6.8 - Support Materials for Surface Processing Impact Assessment (per Tonne of Soda Ash)

Impact Category	Unit (per Tonne Soda Ash)	Filter Aid (DE)	Perlite	Lime	Anti-foam	Coagulant	Activated Carbon	Urea	HCl	Biocides	Steel	Oil	Other	Total
Ozone Depletion	kg CFC_{11} eq	2.9E-07	2.5E-11	1.0E-06	4.0E-08	1.0E-10	5.1E-08	3.4E-08	5.2E-09	1.5E-09	8.9E-12	3.3E-12	2.8E-08	**1.5E-06**
Global Warming	kg CO_2 eq	6.3E-01	5.3E-05	2.2E+01	8.6E-01	2.7E-03	2.1E+00	1.8E-01	5.1E-02	9.8E-03	2.1E-04	1.1E-02	2.7E-01	**2.6E+01**
Smog	kg O3 eq	2.7E-02	2.3E-06	4.8E-01	4.5E-02	9.4E-05	2.1E-02	5.5E-03	3.8E-03	4.7E-04	1.4E-05	1.8E-03	1.8E-02	**6.0E-01**
Acidifi-cation	kg SO_2 eq	2.2E-03	1.8E-07	5.4E-02	1.0E-02	5.5E-05	2.4E-03	7.5E-04	4.3E-04	1.1E-04	1.0E-06	1.5E-04	1.2E-03	**7.2E-02**
Eutrophi-cation	kg N eq	6.1E-04	5.1E-08	3.5E-03	1.4E-04	5.3E-05	9.7E-05	3.2E-04	6.1E-06	3.6E-05	1.0E-06	6.8E-06	1.2E-03	**5.9E-03**
Respiratory Effects	kg $PM_{2.5}$ eq	1.6E-04	1.3E-08	4.0E-03	5.6E-04	2.1E-06	1.9E-04	1.2E-04	1.9E-05	7.2E-06	3.5E-07	3.4E-06	1.0E-04	**5.2E-03**
Fossil Fuel Depletion	Mj surplus	1.2E+00	9.9E-05	8.8E+00	2.8E+00	1.9E-03	8.6E-01	4.5E-01	5.0E-02	1.2E-02	1.2E-04	1.6E-01	6.2E-01	**1.5E+01**

Lime is the largest driver in environmental impacts in the surface processing support materials stage. Figure 6.8 displays the relative distribution of the materials among each imapct category.

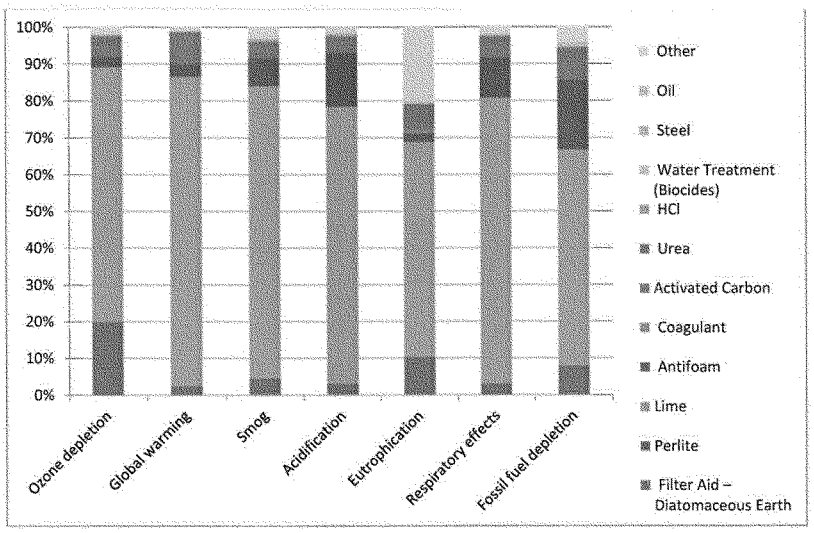

Figure 6.8 – Surface Processing Support Material Environmental Impacts

The lime contributes the majority of the support material impacts. This is consistent with the quantities used in the process, as these are the most used support materials for the process.

The above material data, combined with mining and surface processing information, form the basis for the LCA model. These models and multi-stage representations of the process allow for the tracing of energy and material flows throughout the process.

6.4 Cradle-to-Gate Environmental Impacts

The graphs in this section are designed to communicate the cradle-to-gate environmental impacts of the soda ash. The environmental impact categories are shown in Table 6.9. For more detail on the impact categories, see section 5.2 above.

Table 6.9 –Impact Assessment Impact Categories

Impact category	Unit
Ozone Depletion	kg CFC-11 eq.
Global Warming	kg CO_2 eq.
Smog	kg O_3 eq.
Acidification	kg SO_2 eq.
Eutrophication	kg N eq.
Respiratory Effects	kg $PM_{2.5}$ eq.
Fossil Fuel Depletion	MJ Surplus

The TRACI impact assessment methodology is intended to be used to assist companies, federal facilities, and industrial organizations in performing broad-based impact assessments of a product's human health, environmental and resource depletion impacts. The above seven categories were chosen based on their perceived societal value in the United States and relevance to soda ash production. TRACI does not apply a weighting factor to impact categories, therefore no weighting factors were added in this study.

Table 6.10 and Figure 6.9 demonstrate the potential environmental impacts of producing one metric tonne of soda ash.

Table 6.10 - Cradle-to-Gate Impact Assessment of Soda Ash (per Tonne)

Impact category	Unit (per Tonne Soda Ash)	Mining Support Materials	Mining Materials Transport	Mining Operations	Surface Processing Materials	Surface Material Transport	Surface Processing	Total
Ozone Depletion	kg CFC_{11} eq	2.0E-07	4.2E-12	2.1E-10	1.5E-06	1.2E-10	8.3E-08	**1.8E-06**
Global Warming	kg CO_2 eq	5.3E+00	1.1E-01	2.2E+02	2.6E+01	3.1E+00	6.8E+02	**9.4E+02**
Smog	kg O3 eq	3.5E-01	1.8E-02	1.1E+00	6.0E-01	5.2E-01	2.3E+01	**2.6E+01**
Acidification	kg SO_2 eq	3.0E-02	6.5E-04	1.9E-01	7.2E-02	1.9E-02	2.9E+00	**3.2E+00**
Eutrophication	kg N eq	2.3E-02	3.6E-05	2.4E-03	5.9E-03	1.0E-03	6.1E-02	**9.3E-02**
Respiratory Effects	kg $PM_{2.5}$ eq	8.0E-03	1.1E-05	1.0E-02	5.2E-03	3.3E-04	1.5E-01	**1.7E-01**
Fossil Fuel Depletion	MJ surplus	5.6E+00	2.0E-01	3.0E+01	1.5E+01	5.7E+00	4.5E+02	**5.1E+02**

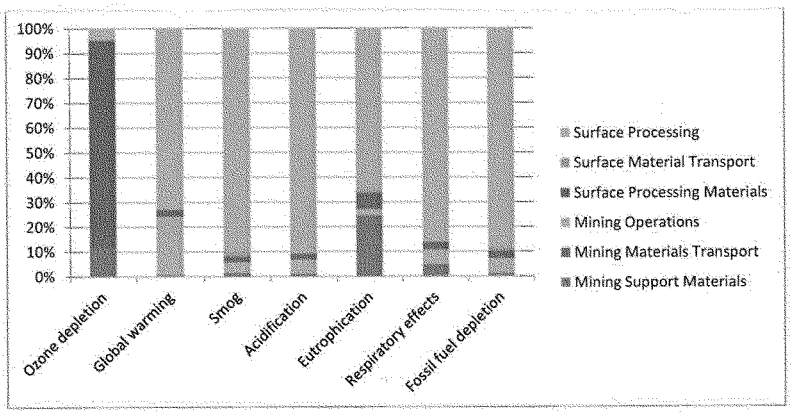

Figure 6.9 – Cradle-to-Gate Potential Environmental Impacts of One Metric Tonne Soda Ash

The surface processing stages make up most of the cradle-to-gate environmental impacts except for ozone depletion. The main driver of the processing stage is the natural gas and coal consumption for calcination and steam generation. Ozone depletion is driven by the support materials used at the surface which is primarily the lime.

Considering most readers of this study may not fully understand the relative importance or magnitude of the environmental impacts disclosed above, it can be helpful to show these impacts normalized on a per-capita basis. The TRACI methodology enables this normalization by providing estimated environmental impacts on a per-capita basis in the United States (that is, they take the estimated environmental impact of all activity within the United States and divide by the population to get the estimated impacts per person). Figure 6.10 shows the normalized cradle-to-gate impacts.

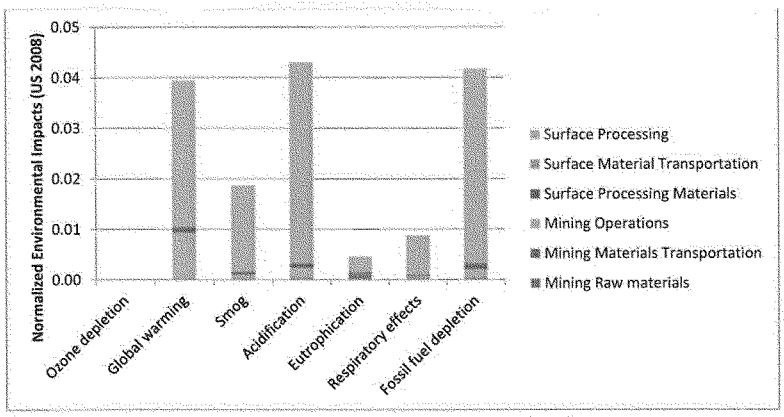

Figure 6.10 - TRACI Normalization of One Metric Tonne of Cradle-to-Gate Soda Ash

Acidification is the largest normalized environmental impact category for soda ash with 0.043. Ozone depletion is the least direct category with 1.4E-05.

6.5 Packaging

Most soda ash is shipped in bulk via rail cars. A small percentage is packaged. Soda ash can be packaged in a variety of ways. Two packaging types were investigated – fifty pound bags and super sacks. An impact assessment was conducted of the three packaging assemblies– bulk, bags and super sacks. Table 6.11 has the impact assessment results of the cradle-to-gate processing of soda ash using the three packaging scenarios.

Table 6.11 - Packaging Impact Assessment of Cradle-to-Gate Soda Ash

Impact category	Unit (per Tonne Soda Ash)	Bulk	50 lb Bags	Super Sacks
Ozone Depletion	kg CFC-11 eq	1.8E-06	4.0E-06	1.8E-06
Global Warming	kg CO2 eq	9.4E+02	9.7E+02	9.4E+02
Smog	kg O3 eq	2.6E+01	2.8E+01	2.6E+01
Acidification	kg SO2 eq	3.2E+00	3.4E+00	3.3E+00
Eutrophication	kg N eq	9.3E-02	2.0E-01	9.4E-02
Respiratory Effects	kg PM2.5 eq	1.7E-01	1.9E-01	1.7E-01
Fossil Fuel Depletion	MJ surplus	5.1E+02	5.3E+02	5.2E+02
Cumulative Energy Demand	MJ	8.2E+03	9.5E+03	8.4E+03

As no additional material is assumed for bulk shipments, this mode is the least impactful. Figure 6.10 shows the relative contribution of the packaging assemblies of soda ash.

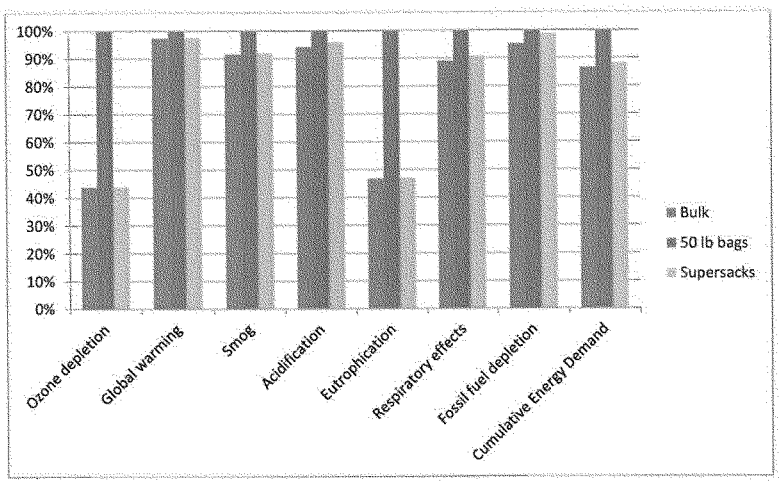

Figure 6.11 - Packaging Impact Assessment of One Metric Tonne of Cradle-to-Gate Soda Ash

Packaging in fifty pound bags has the largest environmental impacts for soda ash; this result is due to the increased material required for packaging one tonne of soda ash compared to super sacks, or no packaging via bulk transportation. By working with customers and packaging suppliers to decrease the amount of packaging, and continuing to use bulk transportation for the majority of soda ash shipment can keep environmental impacts lower.

6.6 Distribution Impacts

The distribution of soda ash has a significant environmental impact when compared to the cradle-to-gate impacts. Since the soda ash produced by the five producers is used globally, several distribution scenarios were analyzed to illustrate the range of impacts. Figure 6.12 shows the relative impacts of each distribution scenario compared to the cradle-to-gate impacts for reference.

Table 6.12 – Relative Distribution Impacts Compared to Cradle-to-Gate Impacts of Soda Ash

Impact category	Unit	Shanghai	Santiago	New York	Houston	Seattle	Frankfurt	Lagos	Pretoria
Ozone Depletion	kg CFC_{11} eq	2.5E-05	2.1E-05	1.8E-06	1.8E-06	1.8E-06	1.6E-05	2.2E-05	3.3E-05
Global Warming	kg CO_2 eq	1.4E+03	1.3E+03	1.0E+03	1.0E+03	9.9E+02	1.4E+03	1.4E+03	1.6E+03
Smog	kg O3 eq	2.3E+02	2.0E+02	8.1E+01	6.4E+01	5.3E+01	2.0E+02	2.3E+02	3.2E+02
Acidification	kg SO_2 eq	1.3E+01	1.1E+01	4.9E+00	4.4E+00	4.0E+00	1.0E+01	1.2E+01	1.6E+01
Eutrophication	kg N eq	1.0E+00	8.6E-01	2.0E-01	1.6E-01	1.4E-01	7.4E-01	9.3E-01	1.3E+00
Respiratory Effects	kg $PM_{2.5}$ eq	5.3E-01	4.8E-01	2.0E-01	1.9E-01	1.8E-01	4.2E-01	5.0E-01	6.6E-01
Fossil Fuel Depletion	MJ surplus	1.4E+03	1.2E+03	6.8E+02	6.2E+02	5.9E+02	1.2E+03	1.3E+03	1.7E+03

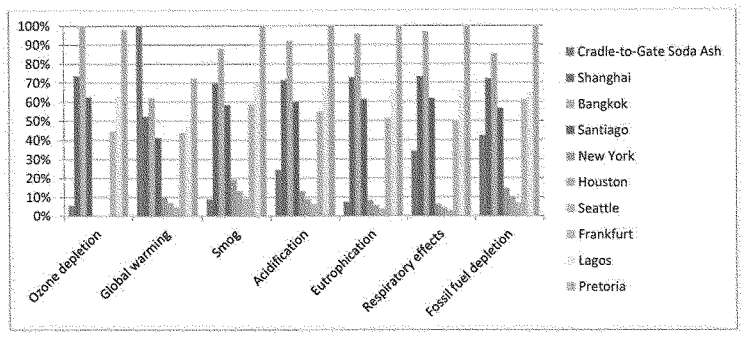

Figure 6.12– Relative Distribution Impacts Compared to Cradle-to-Gate Impacts of Soda Ash

Not surprisingly, longer transport distances generally correlate to higher impacts. Therefore farther destinations (Pretoria, Bangkok, Shanghai, Lagos) have relatively large impacts, in many cases larger even than the cradle-to-gate impact. The domestic destinations within the United States represent the smallest impacts, though in most categories still a significant fraction of the cradle-to-gate impacts.

7.0 Limitations

This LCA is for internal use only among IMA-NA soda ash producers. A formal peer review has been conducted and was found to conform to ISO 14040 and 14044 standards and best practices. Efforts to communicate these results externally are planned.

The results of an LCA are inherently limited by the fact that characterized environmental impacts are "potential" impacts, and not a prediction of real impacts. Actual impacts will occur based on many variables of the system and nature, and can change in real time.

All data for the operation of the various facilities, as well as transportation distances and modes, were collected directly from participating soda ash producers. Efforts were made to check the data for internal consistency and to verify data with facility personnel.

The findings in this research are limited by the inherent uncertainty of creating a representative model through LCA. Assumptions were made in modeling the product system with representative processes and datasets, as previously stated. The authors addressed the uncertainty in modeling decisions by conducting sensitivity analyses as the models were being constructed (as well as data verification/validation relative to study goals).

Further limitation exists due to the use of proxy materials for some support materials, the regional electricity grid mixes, and the weighted averages of the facilities. All of these represent reasonably accurate approximations, but not exact amounts.

While quality control was undertaken at each step in building the LCI and conducting the LCIA, uncertainty is still present in the results since the data evaluated represent one year of production. Detailed evaluation of a longer time period would reduce the uncertainty. Some level of uncertainty is inherent in conducting LCA and decision making must reflect this fact.

8.0 Conclusions

Based on the results from the life cycle assessment, the surface processing of soda ash is the primary driver of environmental impacts for cradle-to-gate soda ash production. Impacts in production can be reduced by further increasing energy efficiency and reducing process losses.

Soda ash producers also have influence over the modes of transportation for support materials and final products. Members already ship finished product by rail, which is reflected in the low impacts for domestic distribution. For input support materials shipped by truck, members might consider requiring suppliers to join EPA's SmartWay program, a free public/private collaboration intended to increase transportation efficiency.

Overall, the US soda ash industry is demonstrating a commitment to transparency and continuous improvement by measuring environmental impacts through life cycle assessment.

9.0 Recommendations

This information can prepare soda ash producers for future sustainable supply chain requirements and can form the basis of marketing literature focused on environmental benefits. This LCA will also assist the soda ash producers with evaluating any green product claims by competitors.

Soda ash producers should use this life cycle assessment for evaluating process improvements, alternate support materials and source locations, and recycled content in materials (e.g. steel) as part of a continuous improvement program. Additionally, the US Soda Ash LCA can be used as a basis to meet future requirements for customer sustainable purchasing programs and government requirements.

Sub-metering of energy use would be helpful to measure and benchmark energy use for energy efficiency opportunity analysis. As coal and natural gas combustion are a significant part of the manufacturing process, soda ash producers should also evaluate opportunities for energy conservation including waste heat recovery, and process optimization to reduce energy consumption and related impacts in mining and surface processing operations. Soda ash producers may also wish to seek methods to reduce methane emissions from the trona mines.

Sustainable Solutions Corporation is recommending publication of the soda ash data after the study has undergone critical review. Soda ash producers should also consider submitting the final inventory to a publicly available database to be used by other LCA practitioners.

Appendix A: Comparisons to Published Soda Ash Inventories

This is not the first soda ash life cycle study. The CLCD database has two inventories for synthetically produced soda ash in China, and one inventory for natural soda ash in China.

Ammonia-Soda Process

The first synthetic inventory represents the ammonia-soda process which involves limestone, coke or hard coal, and sodium chloride brine. The inventory includes a few auxiliary materials as well. In this process the sodium chloride, often recovered sea salt, is dissolved in water and calcium and magnesium are removed by precipitation as carbonate or hydroxide. Separately, a mixture of hard coal or coke and limestone are reacted in a kiln into which air is injected to combust the coal/coke to provide heat and carbon dioxide while the heat produced in that combustion calcines the limestone (calcium carbonate) into calcium hydroxide and additional carbon dioxide. The carbon dioxide from the kiln and gaseous ammonia recycled from later in the process are then injected into the sodium chloride brine, creating a mixture of sodium bicarbonate and ammonium chloride. Sodium bicarbonate, as the least soluble salt, precipitates out of the solution and is recovered by centrifugation. The depleted brine, now mostly ammonium chloride, is reacted with the lime from the kiln to produce calcium chloride solution and gaseous ammonia which is recycled. The calcium chloride can be recovered for sale, or more usually, wasted. The centrifuged sodium bicarbonate is calcined to produce light density soda ash. If dense soda ash is required, the light density soda ash can be rehydrated to form monohydrate crystals and then dried to dense ash. Several of the largest soda ash factories in China, including those that produce most of the soda ash which is exported from China, utilize the ammonia-soda process.

Combined Process (Hou Process)

The second synthetic inventory represents a modified synthetic process used in many of the smaller soda ash factories in China, and especially in the interior of the country. This "combined process", often called the "Hou process" after its inventor, does not produce calcium chloride, but rather recovers ammonium chloride as a co-product to the soda ash. The ammonium chloride is popular as a low quality but inexpensive nitrogen fertilizer for use, for instance, on rice crops. The process is similar on the front end to the ammonia-soda process, but instead of reacting the ammonium chloride with calcium hydroxide and recycling the ammonia, the ammonium chloride is recovered as a solid by adding additional sodium chloride and ammonia to the bicarbonate-depleted brine, then reducing the temperature which causes the ammonium chloride to crystallize out. As with the ammonia-soda process, the combined process produces light density soda ash.

Natural Soda Ash

The third inventory relates to natural soda ash. In China there is little commercially mineable natural sodium carbonate, but there is a deep (~2000 meters), thin (.6 meters

thick) nahcolite (sodium bicarbonate mineral) deposit which is commercially solution mined and is an important source of soda ash in China. The process entails injecting water into the formation and recovering the saturated sodium carbonate/bicarbonate solution in nearby wells. Surface processing of the saturated brine is completed for some of the production by crystallizing sodium sesquicarbonate, calcining the recovered sesquicarbonate crystals to release carbon dioxide and form sodium carbonate, then recrystallizing the sodium carbonate as sodium carbonate monohydrate which is dried to dense soda ash. Another portion of the production reportedly is completed by steam stripping the solution, converting the remaining balance of the bicarbonate using hydroxide, then crystallizing the soda ash as the monohydrate.

Several other smaller operations utilizing surface deposits of sodium carbonates may also be included in this inventory.

A.1 Cradle-to-Gate Analysis

These inventories are shown in Appendix C. The inventory was entered into SimaPro and analyzed using the same impact categories as the IMA-NA average soda ash in previous sections. The impacts of one metric tonne of Chinese synthetic soda ash are show in Table A.1.

Table A. 1 Cradle-to-Gate Environmental Impacts of One Tonne Synthetic Soda Ash Produced in China (CLCD)

Impact category	Unit	Chinese Natural Soda Ash	Chinese Ammonia-Soda Process	Chinese Combined Process
Ozone Depletion	kg CFC_{11} eq	1.2E-07	4.3E-07	4.0E-07
Global Warming	kg CO_2 eq	2.0E+03	1.5E+03	1.9E+03
Smog	kg O3 eq	6.9E+01	7.0E+01	7.3E+01
Acidification	kg SO_2 eq	5.4E+00	1.5E+01	6.3E+01
Eutrophication	kg N eq	1.3E-01	1.3E+00	4.8E+00
Respiratory Effects	kg $PM_{2.5}$ eq	5.2E+00	5.2E+00	5.5E+00
Fossil Fuel Depletion	MJ surplus	2.2E+02	2.3E+02	3.9E+02
CED	MJ	2.3E+04	2.3E+04	3.3E+04

For most impact categories, of the three Chinese inventories the combined process has the largest environmental impacts from a cradle-to-gate perspective. For global warming, the natural soda ash has the largest impacts while the ammonia-soda process has the least impacts. For ecotoxicity, the natural soda ash also has the largest relative impacts compared to the synthetic processes. For Ozone depletion, the ammonia-soda process has the largest impacts while natural soda is the least impactful for this process.

As it is valuable to show how the Chinese models compare to US natural soda ash, Table A.2 and Figure A.1 shows the relative impact to each environmental impact category.

Table A. 2 - Environmental Impacts of US Natural Soda Ash and Chinese Soda Ash

		IMA-NA	Chinese Models		
Impact category	Unit	Cradle-to-Gate	Natural Soda Ash	Ammonia-Soda Process	Combined Process
Ozone Depletion	kg CFC-11 eq	1.8E-06	1.2E-07	4.3E-07	4.0E-07
Global Warming Potential	kg CO_2 eq	9.4E+02	2.0E+03	1.5E+03	1.9E+03
Smog	kg O_3 eq	2.6E+01	6.9E+01	7.0E+01	7.3E+01
Acidification	mol H+ eq	3.2E+00	5.4E+00	1.5E+01	6.3E+01
Eutrophication	kg N eq	9.3E-02	1.3E-01	1.3E+00	4.8E+00
Respiratory Effects	kg PM_{10} eq	1.7E-01	5.2E+00	5.2E+00	5.5E+00
Fossil Fuel Depletion	MJ surplus	5.1E+02	2.2E+02	2.3E+02	3.9E+02

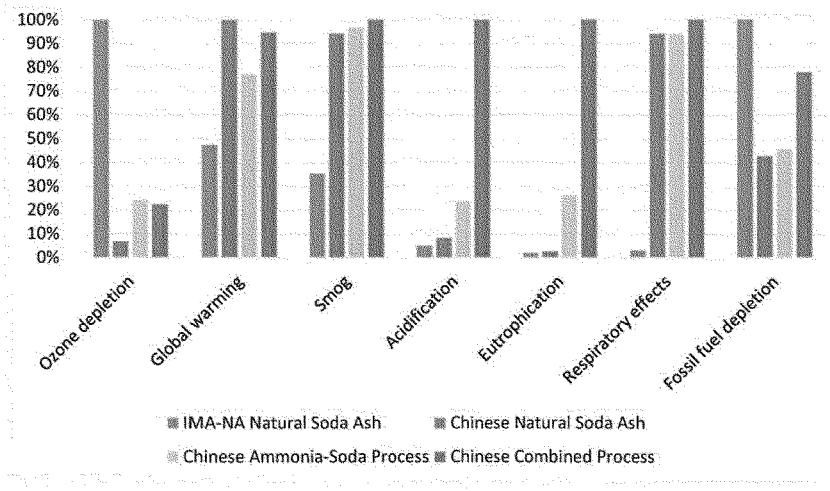

Figure A. 1- Relative Environmental Impacts of US Mined Soda Ash and Chinese Synthetic Soda Ash

Note that it is not expected that the results should be similar. The synthetic production process is very different than the process used by the producers in this study. Life cycle

assessment studies vary in scope, system boundaries, data quality, formulation, technology, geography, time period, value choices, and others. This variability inevitably leads to different results, and thus very few LCA studies can be compared exactly.

United States natural soda ash is more impactful compared to the Chinese models for ozone depletion and fossil fuel depletion. However, for smog, acidification and eutrophication and cumulative energy demand the Chinese combined process appears to be the most impactful of the soda ash processes. For Global warming, the Chinese natural soda ash model has the largest impact.

A.2 Distribution Analysis

While the cradle-to-gate analysis of soda ash is important, other life cycle stages are important to consider when evaluating the life cycle of a product. As distribution of soda ash is worldwide, an analysis on the impact of transporting soda ash to a variety of locations was conducted for the US soda ash and the Chinese soda ash. For this analysis, dense soda ash was assumed. Light soda ash may differ as ocean freighters may be volume limited instead of weight limited.

Eight cities were focused on for the transportation analysis; these and their assumed transportation distances can be found in Table A.3. Distances for the Chinese soda ash producers were modeled as coming from 367 miles outside of the Port of Shanghai; as producers may be located in other regions of China, these distances may increase accordingly. 50 miles was the distance assumed from an arrival port to a customer's gate for soda ash.

Table A. 3 - Transportation Distances to Various Regions from China and the United States (miles)

Miles	Shanghai	Bangkok	Santiago	New York	Houston, TX	Seattle	Frankfurt	Lagos	South Africa
From China									
Truck	0	50	50	2,863	50	50	496	50	386
Rail	50	367	367	367	367	367	367	367	367
Ocean Freight	0	2,473	11,685	5,802	11,610	5,802	12,655	11,679	7,944
From United States									
Truck	367	50	71	-	-	-	500	50	386
Rail	848	848	8,48	2,000	1,377	966	2,000	2,000	2,000
Ocean Freight	6,551	8,899	5,567	-	-	-	3,974	5,642	8,713

This analysis focuses on global warming potential due to its relevance to transportation, high global concern, and ease of understanding. Table A.4 displays the potential impacts of Global Warming for one tonne of soda ash from the Cradle-to-Customer Door perspective.

Table A. 4 - Cradle-to-Customer Door Scenario Analysis on One Tonne of Natural and Synthetic Soda Ash (kg CO_2 eq /Tonne Soda Ash)

Process	Shanghai	Bangkok	Santiago	New York	Houston	Seattle	Frankfurt	Lagos	Pretoria
US Natural Soda Ash	1,435	1,528	1,330	1,037	1,008	988	1,354	1,386	1,624
Chinese Natural Soda Ash	1,993	2,077	2,377	2,631	2,375	2,195	2,476	2,377	2,313
Chinese Ammonia-Soda Process	1,531	1,616	1,916	2,169	1,913	1,734	2,015	1,916	1,852
Chinese Combined Process	1,886	1,971	2,271	2,524	2,268	2,089	2,370	2,271	2,207

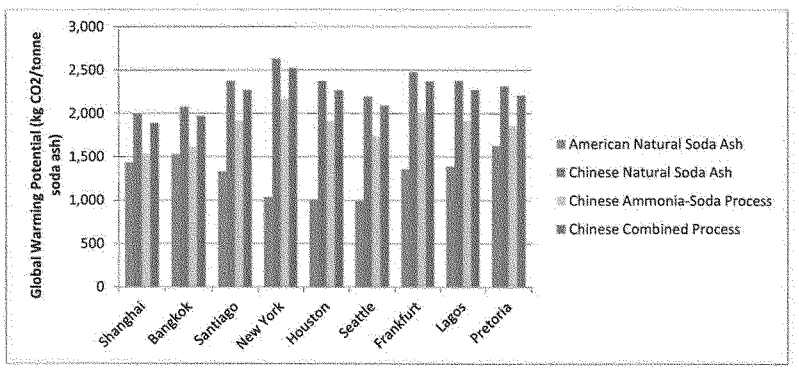

Figure A. 2 - Cradle-to-Customer Door Sensitivity Analysis on One Tonne of Natural and Synthetic Soda

In most scenarios, the Chinese mined soda ash product had the highest carbon footprint of the four models. The ammonia-soda process has less of a carbon footprint for soda ash being shipped to Shanghai than the others. Shipments to Pretoria are about equivalent for US soda ash and for ammonia-soda produced soda ash. For the remaining scenarios, the US natural soda ash is more favorable.

Looking at additional impact categories besides global warming, more variation in impacts can be observed. Figure A.3 depicts the four soda ash models transported to Shanghai.

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Life Cycle Assessment
Soda Ash
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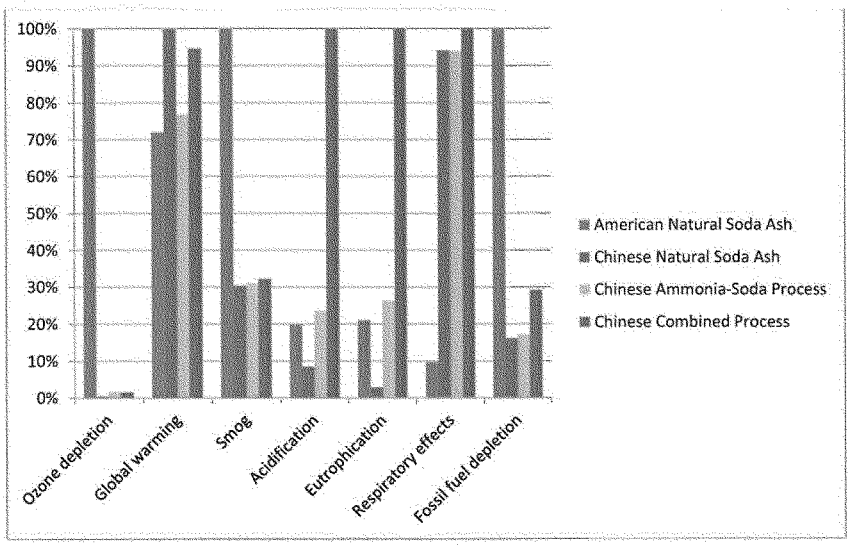

Figure A. 3 - Impact Assessment of One Tonne of Natural and Synthetic Soda Ash to Shanghai

The US natural soda ash has larger potential impact for ozone depletion and fossil fuel depletion. The Chinese combined process has largest relative potential impacts in acidification, eutrophication and respiratory effects of the four models. Chinese natural soda ash has the largest relative potential environmental impact for global warming.

A.3 CLCD Inventories

soda-natural soda process.xml

soda-ammonia soda process.xml

soda-combined soda process.xml

Appendix B: Caustic Soda Comparison

To provide relative context as to how soda ash performs environmentally, a comparison to three caustic soda secondary data sets, in relative terms of one metric tonne of Na_2O, is shown below compared to soda ash in relative terms of Na_2O. Stoichiometrically, 1.29 tonnes of caustic soda equates to one tonne of Na_2O, and 1.71 tonnes of soda ash produces 1 tonne of Na_2O.

As the processing of caustic soda is different from natural soda ash, the environmental impacts will be different as well. The Ecoinvent data set is based on average European production of one metric ton (tonne) of sodium hydroxide in a 50% solution, representing a mix of mercury cell (55.1%), diaphragm cell (23.5%), and membrane cell (21.4%) technologies. The second data set uses the Ecoinvent data and replaces electricity and fuels with US data sets to more closely represent conditions in the United States. The third caustic soda data set is from a study conducted by Franklin Associates for one tonne of US sodium hydroxide and entered into the US LCI database, but with gaps later filled in with US-Ecoinvent proxy data.

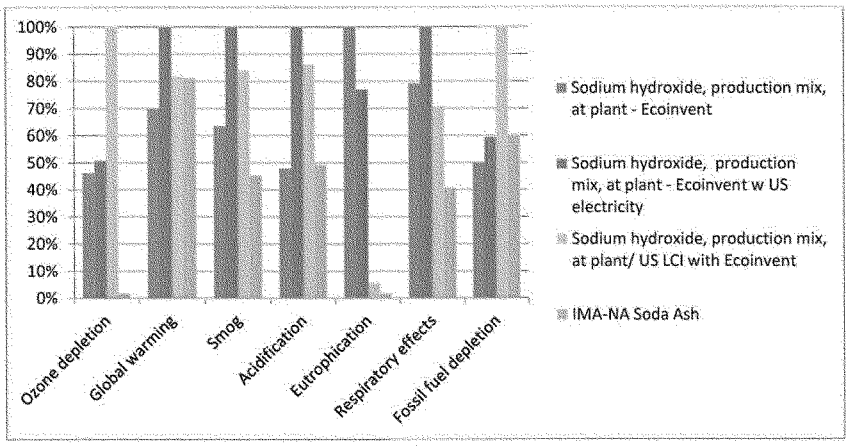

Figure B. 1 –Comparison between Caustic Soda Models and IMA-NA Natural Soda Ash, on a Relative Na_2O Basis

Per this comparison, natural soda ash, on a per tonne Na_2O basis, has less potential environmental impacts compared to caustic soda for most impact categories and most inventory datasets. For global warming potential and fossil fuel depletion, natural soda ash is comparable.

Appendix C: Process Flow Diagram

The following process flow diagram of the soda ash monohydrate process was obtained from Chapter 3 of the Energy and Environmental Profile of the U.S. Mining Industry (December 2002), prepared for the US Department of Energy by BCS Inc.

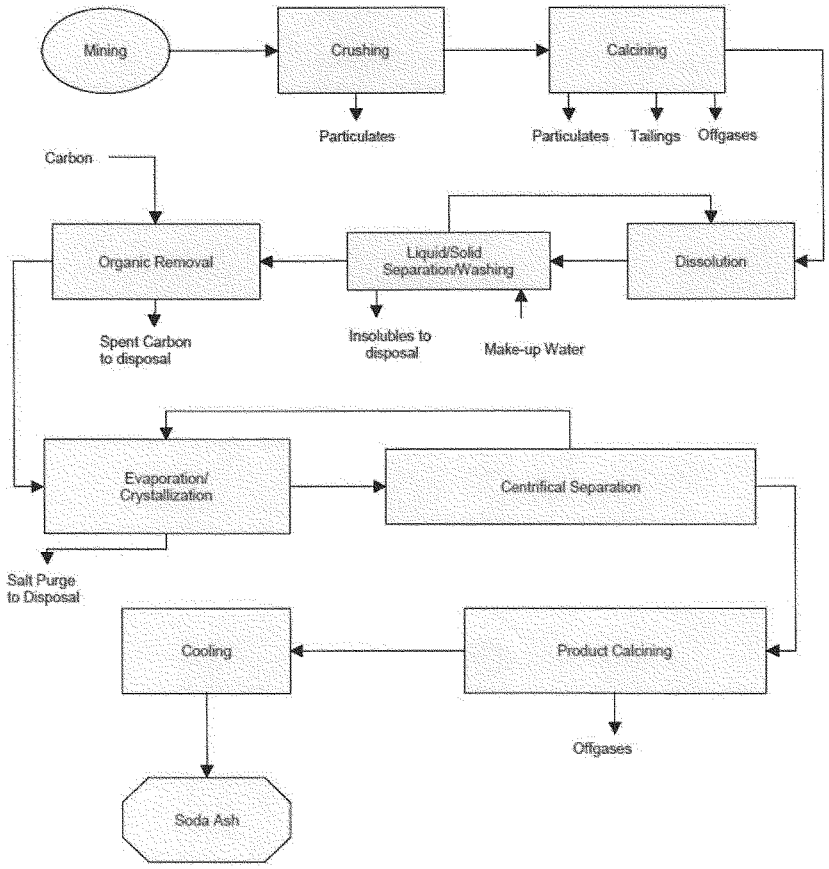

Figure C. 1 - Soda Ash Monohydrate Process Flow Diagram

Appendix D: Unit Conversions and Fuel Factors

General Conversion	
100,043.03124	Btu/therm
0.45359237	kg/lb
0.028316847	m^3/scf
3.785411784	liters/gal
264.1720524	gal/m^3
3412.14163	Btu/kWh
Propane	
0.493	g/cm^3
Natural Gas	
1.03E-03	mmBtu/scf
3.63E-02	mmBtu/m^3

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Appendix E: Pedigree Matrix for Data Quality

Indicator score	1	2	3	4	5	Remarks
Reliability	Verified data based on measurements	Verified data partly based on assumptions OR non-verified data based on measurements	Non-verified data partly based on qualified estimates	Qualified estimate (e.g. by industrial expert); data derived from theoretical information (stoichiometry, enthalpy, etc.)	Non-qualified estimate	verified means: published in public environmental reports of companies, official statistics, etc unverified means: personal information by letter, fax or e-mail
Completeness	Representative data from all sites relevant for the market considered over an adequate period to even out normal fluctuations	Representative data from >50% of the sites relevant for the market considered over an adequate period to even out normal fluctuations	Representative data from only some sites (<=50%) relevant for the market considered OR >50% of sites but from shorter periods	Representative data from only one site relevant for the market considered OR some sites but from shorter periods	Representativeness unknown or data from a small number of sites AND from shorter periods	Length of adequate period depends on process/technology
Temporal correlation	Less than 3 years of difference to our reference year (2000)	Less than 6 years of difference to our reference year (2000)	Less than 10 years of difference to our reference year (2000)	Less than 15 years of difference to our reference year (2000)	Age of data unknown or more than 15 years of difference to our reference year (2000)	less than 3 years means: data measured in 1997 or later; score for processes with investment cycles of <10 years; for other cases, scoring adjustments can be made accordingly
Geographical correlation	Data from area under study	Average data from larger area in which the area under study is included	Data from smaller area than area under study, or from similar area		Data from unknown OR distinctly different area (north america instead of middle east, OECD-Europe instead of Russia)	Similarity expressed in terms of enviornmental legislation. Suggestion for grouping: North America, Australia; European Union, Japan, South Africa; South America, North and Central Africa and Middle East; Russia, China, Far East Asia
Further technological correlation	Data from enterprises, processes and materials under study (i.e. identical technology)		Data on related processes or materials but same technology, OR Data from processes and materials under study but from different technology	Data on related processes or materials but different technology, OR data on laboratory scale processes and same technology	Data on related processes or materials but on laboratory scale of different technology	Examples for different technology: - steam turbine instead of motor propulsion in ships - emission factor B(a)P for diesel train based on lorry motor data Examples for related processes or materials: - data for tyles instead of bricks production - data of refinery infrastructure for chemical plants infrastructure
Sample size	>100, continous measurement, balance of purchased products	>20	> 10, aggregated figure in env. report	>=3	unknown	sample size behind a figure reported in the information source

Figure E. 1- Pedigree Matrix used to assess the Quality of Data Sources, Derived from (Pedersen, Weidema & Wesnaes 1996)

Appendix F. TRACI Fossil Fuel Depletion Characterization Factors

Compartment	Subcompartment	Substance	CAS No.	Factor	Unit
Raw	(unspecified)	Coal, 18 MJ per kg		0.155	MJ surplus / kg
Raw	(unspecified)	Coal, 22.7 MJ per kg*		0.168	MJ surplus / kg
Raw	(unspecified)	Coal, 26.4 MJ per kg		0.227	MJ surplus / kg
Raw	(unspecified)	Coal, 29.3 MJ per kg		0.252	MJ surplus / kg
Raw	(unspecified)	Coal, feedstock, 26.4 MJ per kg		0.227	MJ surplus / kg
Raw	(unspecified)	Coal, hard		0.165	MJ surplus / kg
Raw	(unspecified)	Energy, from coal		0.00859	MJ surplus / MJ
Raw	(unspecified)	Energy, from gas, natural		0.15	MJ surplus / MJ
Raw	(unspecified)	Energy, from oil		0.144	MJ surplus / MJ
Raw	(unspecified)	Gas, mine, off-gas, process, coal mining/kg	008006-14-2	6.56	MJ surplus / kg
Raw	(unspecified)	Gas, mine, off-gas, process, coal mining/m3	008006-14-2	5.38	MJ surplus / m3
Raw	(unspecified)	Gas, natural, 30.3 MJ per kg	008006-14-2	4.55	MJ surplus / kg
Raw	(unspecified)	Gas, natural, 35 MJ per m3	008006-14-2	5.25	MJ surplus / m3
Raw	(unspecified)	Gas, natural, 36.6 MJ per m3	008006-14-2	5.49	MJ surplus / m3
Raw	(unspecified)	Gas, natural, 46.8 MJ per kg	008006-14-2	7.02	MJ surplus / kg
Raw	(unspecified)	Gas, natural, feedstock, 35 MJ per m3	008006-14-2	5.25	MJ surplus / m3
Raw	(unspecified)	Gas, natural, feedstock, 46.8 MJ per kg	008006-14-2	7.02	MJ surplus / kg
Raw	(unspecified)	Gas, natural/m3	008006-14-2	5.173	MJ surplus / m3
Raw	(unspecified)	Oil, crude		6.22	MJ surplus / kg
Raw	(unspecified)	Oil, crude, 38400 MJ per m3		5530	MJ surplus / m3
Raw	(unspecified)	Oil, crude, 41 MJ per kg		5.9	MJ surplus / kg
Raw	(unspecified)	Oil, crude, 42 MJ per kg		6.04	MJ surplus / kg
Raw	(unspecified)	Oil, crude, 42.6 MJ per kg		6.13	MJ surplus / kg
Raw	(unspecified)	Oil, crude, 42.7 MJ per kg		6.15	MJ surplus / kg
Raw	(unspecified)	Oil, crude, feedstock, 41 MJ per kg		5.9	MJ surplus / kg
Raw	(unspecified)	Oil, crude, feedstock, 42 MJ per kg		6.04	MJ surplus / kg

**"Coal, 22.7 MJ per kg" was included in this methodology as Kemmerer coal is consumed by a majority of the producers. The characterization factor was adjusted accordingly in proportion to other coal grades.*

Mr. VON AHRENS. Thank you.

The new synthetic soda ash facilities in countries such as India and Vietnam, lack the environmental regulation and the associated cost of manufacturing that we have in the United States. Emissions from a recently commissioned plant in Vietnam have poisoned local waters, resulting in mass fish kills, and have lowered air quality to unhealthy levels in surrounding communities.

Mr. Chairman, from 1996 to 2006 and 2011 to 2013 when the royalty rate was six percent approximately, 1,000 jobs were lost, the global market share declined, and China went from importing more than one billion tons of soda ash to being a major exporter, and is now the United States' largest competitor.

When the royalty was lowered to two percent from 2006 to 2011, in the midst of a global recession, a number of positive things happened. Royalties to the government rose to more than $80 million. The industry not only retained jobs, it created 100 new jobs. The industry nearly doubled its rate of investment in spending to nearly $150 million annually to expand capacity and much needed improvements. The program continued to support education systems as confirmed by the current and past Governors of Wyoming.

Congress has the opportunity to increase global competitiveness, increase jobs and reduce global greenhouse gases by passing this bill.

Thank you for your consideration of our views. I'd be pleased to take any questions.

[The prepared statement of Mr. von Ahrens follows:]

Testimony of Mr. Fred von Ahrens

Vice President, Manufacturing, Tronox Alkali, Green River, Wyoming

S. 2031 "American Soda Ash Competitiveness Act"

Before the

SUBCOMMITTEE ON PUBLIC LANDS, FORESTS AND MINING

SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

October 1, 2015

Good afternoon Chairman Barrasso, Ranking Member Wyden, and members of the Subcommittee.

My name is Fred von Ahrens. I am the vice president of manufacturing for Tronox Alkali, in Green River, Wyoming. Tronox operates two trona ore mines and several processing and refining facilities in Green River, at which we produce natural soda ash, an essential ingredient in the production of glass and detergents. We also produce forms of sodium bicarbonate – more commonly known as baking soda. In addition to its use in the food industry, sodium bicarbonate is widely used in the agriculture and healthcare industries.

I am here representing Tronox Alkali, and the four other U.S. producers of natural soda ash – Tata Chemicals, OCI, and Solvay, also based in Green River, and Searles Valley Minerals, based in Southern California.

I am pleased to report that the soda ash mined and processed on federal lands is the country's largest inorganic chemical export by volume, contributing more than one billion dollars annually to our balance of trade. These five companies meet almost 100 percent of the domestic need for soda ash.

Combined, the five U.S. natural soda ash producers employ more than 3,000 full-time skilled workers, approximately 1,000 of whom are represented by the United Steelworkers. A recent report prepared by PricewatershouseCooper for the Industrial Minerals Association - North America notes that 18,000 indirect jobs are also dependent on the U.S. Natural Soda Ash Industry, including port workers in Washington state, Oregon, California, and Texas, the railroads, the glass packaging and window manufacturing industries, and the auto industry. The five companies also have corporate offices in Connecticut, New Jersey, Oklahoma, Pennsylvania, and Texas, with staff totals of more than 500.

I would like to submit for the record, letters written in support of S.2031 by the International Longshore and Warehouse Union, the United Steelworkers, the Glass Packaging Institute, and the Union Pacific Railroad.

S.2031 and H.R.1992 set a two-percent royalty rate on the mining of trona ore on federal lands for a five-year period. Mr. Chairman, recent history has demonstrated that a two percent, as opposed to a six-percent, federal royalty rate can have positive impacts:

- First, it fosters robust export growth consistent with the President's National Export Initiative (NEI);
- Second, it leads to expanded domestic manufacturing capacity and jobs growth; and,
- Third, it results in an increase, rather than a decrease, in federal royalty revenues by spurring development of the resource.

Mr. Chairman, the 2006 and 2013 royalty rates enacted by Congress came out of a recognition that global economic conditions, specifically the emergence of stiff Chinese competition, was

eroding America's natural soda ash advantage. We ask that Congress continue to support the positive growth of this important domestic industry by enacting S.2031 and H.R.1992.

As you are aware, there are two methods of producing soda ash – the natural method utilizing trona ore, employed by the five U.S. companies, and a synthetic process. China is the largest producer and exporter of synthetic soda ash. The natural process is a more efficient way of making soda ash and has significant environmental advantages over the synthetic process, which generates a large carbon footprint and has other negative environmental impacts.

Mr. Chairman, I would like to submit for the record a life-cycle assessment commissioned by the Industrial Minerals Association - North America which contrasts the environmental impact of the Chinese manufacturers to the five U.S. natural soda ash producers.

In addition, new synthetic soda ash facilities are coming on line in countries such as India and Vietnam. Many of these countries lack the environmental regulation – and associated cost to production – that we have in the U.S. Emissions from a recently commissioned plant in Vietnam have poisoned local waters resulting in a mass fish kill and have lowered air quality to unhealthy levels in surrounding communities.

As I mentioned, the five U.S. producers of natural soda ash meet almost 100 percent of the domestic need for the manufacturing of windows, mirrors, auto windshields, and glass containers and other important industries. Over the last year, however, we have seen competitors from Germany, Turkey, and more recently, India enter the U.S. market.

Approximately 58 percent of our production is exported, primarily to the Pacific Rim, Latin America and South America. Ten years ago, this export to domestic ratio was the reverse, with more than 60 percent being used domestically.

This change is directly correlated to the historic fluctuation in the royalty fees the U.S. companies pay for mining on federally owned lands. A higher royalty will also reduce the capital available to our companies that is required to expand our processing capacity and invest in innovations to improve the efficiency of our mining operations.

Mr. Chairman, from 1996 to 2006, when the royalty rate was at six percent, approximately 1,000 jobs were lost in the domestic industry and our global market share declined precipitously. There was a similar decline in market share when the rate reverted to six percent again from 2011 to 2013. This rapid decline in export growth resulted from a sudden and dramatic change in global competition. In the brief span of the decade of the 1990s, China went from importing more than one million tons of soda ash to being a major exporter, and it is now the United States' largest competitor in the region.

We believe that when global demand rebounds, that our industry is well positioned to expand capacity and create greater employment opportunity for skilled workers at wages markedly higher than those in the surrounding community.

In 2006, just as today, our more efficient and lower carbon footprint natural soda ash production process when allowed to compete fairly on a level playing field can beat any other producer in the world. In sum, then as now, if conditions are equal, we know we can compete with any other global producer. From 2006 to 2011, with the predictability of a stable two-percent royalty, the U.S. soda ash industry nearly doubled its rate of investment, spending more than $158 million to expand capacity and make needed improvements.

The U.S. natural soda ash industry has centuries of trona ore reserves to meet domestic and global demand several generations into the future. The cost of production, however is heavily impacted by processing costs, and for the manufacturers to expand capacity and invest in innovative new mining and processing technologies, the industry needs the assurance that it will have the required capital resulting from a two-percent royalty fee over the next five years.

Thus, Mr. Chairman, we again turn to Congress to restore the two-percent royalty rate by enacting S.2031. In sum, soda ash production represents world-scale, U.S.-based manufacturing at its best. We hear every day how American manufacturing jobs are disappearing and we have a shrinking middle class. The production of soda ash from U.S. natural resources in Wyoming and California is done by skilled workers with an average salary of more than $85,000 per year in very small, rural communities. Growing U.S. soda ash exports will increase the number of those jobs. Moreover, it will help grow revenues at the Treasury.

When the Congressional Budget Office produced cost estimates for legislation implementing this proposed royalty reduction, it suggested that the revenue loss to the federal government would be $16 million a year, or $80 million over the five-year period. History, however, shows that this will not be the case. When the royalty was lowered to two percent from 2006 to 2011, royalties to the federal government actually rose over the five year period with the government taking in about $85 million in revenue because of the increased production the royalty reduction helped to generate. And, that was in the midst of a global recession.

Mr. Chairman, I want to address an often cited falsehood regarding job loss during the five-year period from 2006-2011 when Congress last set the royalty rate at two percent. At the height of the recession and at a time of low demand when other commodity manufacturers suffered wide job losses, our industry was able to retain jobs and in fact, created 100 new jobs. In Sweetwater County, Wyoming where four of the natural soda ash companies are located, the unemployment rate was the lowest in the state during this period.

Mr. Chairman, I would also like to address a dissenting view that a lower royalty rate will result in less revenue going to state education programs. As previously noted, past reductions in the royalty rate did not result in federal revenue losses or subsequent reductions in federal funds going to the schools. I would like to submit for the record two letters from Wyoming Governor Matt Mead and former Wyoming Governor David Freudenthal in support of S.2031 and H.R.1992 noting their sentiment that the schools of Wyoming were not, nor will they be negatively affected by the enactment of this legislation.

Mr. Chairman, the U.S. natural soda ash industry provides a unique opportunity to create jobs, strengthen America's manufacturing sector, and have a positive impact on the global environment. Our industry has proven that it will increase jobs by increasing exports, and by increasing the U.S. industry's market share we will also be reducing greenhouse gases. Because the U.S. soda ash industry uses a natural method of producing soda ash, the U.S. industry uses roughly three times less energy and emits two to three times fewer greenhouse gases than our Chinese competitors relying on the synthetic method for production.

The demand for soda ash will be met in some way. This Subcommittee has the opportunity to reduce global greenhouse gases and increase jobs by supporting the U.S. Soda Ash industry. We would suggest the bill before you has already proved successful in doing so, and call on the Congress to reinstate the two percent rate.

Thank you for your consideration of our views. I would be pleased to take any questions from the Subcommittee.

Senator BARRASSO. Thank you very much to each of you.

Mr. Finn, I would like to start, if I could, with you because I mentioned yesterday's Wall Street Journal article. Would you discuss some of the challenges that the Port of Portland is facing in trying to boost exports?

Mr. FINN. Yes, Mr. Chairman.

Historically the Port of Portland and other ports on the Columbia Snake River system have been an export gateway for products from the Pacific Northwest and the interior of the United States and Canada. And we continue, actually, to grow in that capacity. Bulk products, in particular, continue to be very strong from the Port of Portland and other Columbia River ports.

The challenge we face at the Port of Portland is with one particular kind of cargo and that is containerized cargo. We have always operated a medium-sized niche container terminal, primarily for containerized products from Oregon, Washington and Idaho. Due to some differences between labor and management over the operation of that container terminal, we have lost almost all of our container service for the time being.

Efforts are underway to try to restore that container service, but for the time being we only have one, very limited, container carrier calling at the Port of Portland.

Senator BARRASSO. So then what role does soda ash play in Portland's strategy going forward?

Mr. FINN. Going forward, Mr. Chairman, soda ash is one of the many bulk products that form the foundation, really, for our marine business. Since 1987, soda ash has been a steady cargo at the Port of Portland, and it's very important, actually, to our financial foundation that we maintain and try to grow these kinds of foundational cargos while at the same time trying to address this other issue.

Senator BARRASSO. Ms. Leiter, in your testimony you state, "The royalty rate reductions from 2006 to 2011 did not appear to have contributed in a significant way to the creation of new jobs."

I would note that the royalty rate reduction was in effect during one of the worst recessions in decades. I am just wondering if you think how did the royalty rate reduction, maybe, help save or preserve existing jobs within the soda ash industry?

Ms. LEITER. Thanks for the question.

As we say in the written testimony we don't, actually, have the data to assess. The job rate stayed approximately constant through those six years, five years, and we don't have the data to assess what would have happened in the industry during the recession in the absence of that.

Senator BARRASSO. Mr. Douville and Mr. von Ahrens, I wonder if you have some thoughts and would like to respond to that same idea of preserving jobs since things have stayed stable in a time, economically, when our own economy was having significant challenges?

Mr. VON AHRENS. Mr. Chairman, we were not only allowed or not only able to protect jobs, but we added over 100 jobs during that time period. Exports were up, production is up, and Federal revenues are up. Our capital access, as I said in my testimony, was also up.

Senator BARRASSO. Yes.

Is there anything you would like to add, Mr. Douville?

Mr. DOUVILLE. Yeah, during the window, exports were up about 640,000 tons from 2007 through 2011. In the year 2009, exports were actually down almost 900,000 tons year over year. So we were able to come back from the dip in 2009, in large part, because of the royalty rate reduction that we had received, and the fact that we were able to readjust our position in a number of these marketplaces.

Senator BARRASSO. Okay.

Mr. von Ahrens, in your testimony you stated that during the royalty rate reduction from 2006–2011, the U.S. soda ash industry nearly doubled its rate of investment spending more than $158 million to expand capacity and make needed improvements, and that approximately 58 percent of your production is exported. Ten years ago this export to domestic ratio was the reverse with more than 60 percent of it being used here at home domestically.

You then explained this change is directly correlated to the historic fluctuation in the royalty fees that the U.S. companies pay for mining in Federally-owned lands as an impact.

Mr. Douville, you also say that the royalty rate reduction has greatly helped to support additional export growth.

This afternoon, Ms. Leiter testified that the royalty rate reduction from 2006–2011 did not appear to have contributed in a significant way to increased exports or a notable increase in capital expenditures.

Would any of you like to respond to that testimony?

Mr. VON AHRENS. Mr. Chairman, we believe that the BLM takes a narrow view to this. When we look at our investments from a trade perspective, over $300 million of additional trade balance for the increase from 2007 and 2011, and the numbers do not include tax revenues resulting in increased production.

Senator BARRASSO. Mr. Douville, is there anything else you would like to add? Then I will give Ms. Leiter an opportunity to respond.

Mr. DOUVILLE. At the same time as I talked about before, we were up 640,000 tons during the window, and that equated to about $300 million in trade balance improvement during that time. So as Mr. von Ahrens said, we were able to find some real positives in other areas during that time.

Senator BARRASSO. Ms. Leiter, anything on that? I do have another question for you.

Ms. LEITER. I would like to add two things.

The first is that our understanding is that we have seen a growth in exports and that has largely been due to the close of Trona or, excuse me, soda ash manufacturing facilities in various other countries and the U.S. has absorbed that manufacture.

I'd also like to note that the quantity of U.S. exports appears to have trended upward from 2011 to the present even as the royalty rates initially from 2011 to 2013 were restored to the lease rates and then from 2013 to the present as those rates were set at four percent. So we've seen a fairly steady trend upward in exports even as the royalty rate fluctuates in the background.

And that, I think, is also what I would like to point out about the job growth as well. It is true that jobs held steady from 2006 to 2011 but jobs have continued to hold steady and fluctuate only around 100 jobs even from 2011 to the present as the royalty rates returned to the lease rates.

Senator BARRASSO. Yes, you mentioned the fluctuation in rates because it was two percent from 2006 to 2012; Congress enacted legislation and it was four percent from 2013 to 2015. Your testimony discusses the Department's views on these effects of the royalty rate reductions.

I am wondering what your thoughts are on the rate reduction from 2013 to 2015. We heard about the previous years but what about these last couple of years?

Ms. LEITER. So the figures that I have are for 2000. I don't have any figures for 2015. The figures that I have for 2013 and 2014 suggest that production has continued to trend slightly upward. Exports have continued to trend slightly upward, and jobs have stayed approximately constant. And that was true in 2010 and 2011 at the background lease rates of about 5.6 percent, on average, and also in 2013 and 2014 under the four-percent rate.

Senator BARRASSO. Does the Department believe it actually helped save or create jobs, increase investment, boost production, and promote exports of soda ash? And you do not have the numbers for 2015.

Ms. LEITER. Does the Department believe that reducing royalty rate does those things?

Senator BARRASSO. Yes. Help?

Ms. LEITER. No. I think I'd have to say not. [Laughter.]

Senator BARRASSO. Would either of you like to respond on that?

Mr. DOUVILLE. If you look at the period of time, and I'll let Mr. von Ahrens talk about the—any capital that may have been invested in 2011 going into 2012.

If you look at what's happening today, today is very similar to what we saw back in 2009. The Chinese are trying to export their way to achieve some of their GDP objectives, and we've seen a significant reduction in pricing and a significant market share grab.

As I mentioned in my testimony, we anticipate this year that the Chinese will be exporting about 22 percent more than they did a year ago. So as you look at where we are today, our position is that, again, we need this support more than ever so that, again, the benefits that we saw back in '09 we can see those benefits as we continue to carry forward because the industry certainly does need to continue to grow.

Senator BARRASSO. Yes. Anything you would like to add?

Mr. VON AHRENS. Thank you, Chairman.

In the front part of the question is that exports are up. Jobs are up. Production is up. Federal revenues are up, and our capital investment is up.

But, as Mr. Douville mentioned in his testimony, with the headwinds, there's a lag in the impact to our business and we're starting to see that impact now as the yuan is revalued and the consistent support that the Chinese get on export. We are seeing those exports go up, and that will impact us as we go forward.

Senator BARRASSO. Well since you mentioned devaluation and the currency, if we could just spend a couple minutes on this: China's unfair trade practices.

Since 2009, China has given its synthetic soda ash producers a nine percent rebate on China's value added tax. More recently, China devalued its currency by 4.4 percent. It seems that these actions give Chinese soda ash producers what has been described as a $27 per metric ton benefit.

Could you explain what that actually means so people understand how that fits into all of this, this $27 per metric ton benefit?

Mr. DOUVILLE. Yeah.

Senator BARRASSO. Whoever is the best on the panel?

Mr. DOUVILLE. Thank you, I can take that.

If you look at the current market pricing, it's around $200 per metric ton, FOB China. So the nine-percent rebate that they get would be about $18 of the $27. The 4.4 percent devaluation of the currency would be another $8.80, so that's how we get to the approximately $27 benefit.

This year, they're going to export around 2.2 million tons, so together when you multiply that out it's around a $60 million benefit for the Chinese industry. And we saw directly, after the August 11th devaluation, an immediate response from the Chinese producers into the marketplace looking to increase exports. And our market share is definitely at risk.

Senator BARRASSO. To what extent would our bill, if enacted, reduce this unfair benefit?

Mr. DOUVILLE. From what I understand, the CBO has scored this at about $16 million per year and certainly not the full $60 million that the Chinese exporters are seeing today. And if there's a devaluation, again at that $200 number, for every one percent that's devalued it's another $2 per ton. So the 15 to 20 percent could be another $30 to $40 per ton.

Senator BARRASSO. That is the question then if in recent media reports that we have seen, China is considering a further 15 to 20 percent devaluation in the currency.

Mr. DOUVILLE. Yeah.

Senator BARRASSO. So additive, you would have another 30 to 40 based on the $2 per ton.

Mr. DOUVILLE. Right.

Senator BARRASSO. Okay.

I want to ask you about ANSAC for a second.

You have written at least five letters to the Administration asking them to encourage China to eliminate the value added tax rebate to its soda ash producers. Since 2009, members of the House and Senate have also sent letters to the Administration urging the elimination of China's value added tax rebate for soda ash producers.

I am going to enter these letters into the records after today's hearings.

[The information referred to follows:]

China: Importance of VAT Rebate Elimination For U.S. Soda Ash Exports

April 07, 2009

Executive Summary:

In an effort to stimulate soda ash exports, effective April 1, 2009, the People's Republic of China ("PRC") began providing its soda ash exporters a 9% rebate on its 17% value-added tax ("VAT"). China's Ministry of Finance announced this decision in a Circular issued on March 27, 2009, (see www.mof.gov.cn). ANSAC requests that the U.S. Government urge China to eliminate the VAT rebate, which gives Chinese exports a significant advantage over U.S. soda ash exports in third-country markets.

This change in policy is a serious setback for the U.S. soda ash industry, which is already suffering from a signiciant drop in global demand. Chinese soda ash production has skyrocketed over the past decade, largely in the form of inefficient, state-supported synthetic soda ash manufacturing. As supply in China outpaced domestic demand, China became a significant exporter of low-cost soda ash to the Asia-Pacific region, which is also served by U.S. exports through ANSAC. The PRC's 9% VAT rebate for soda ash exports will only increase the incentive for Chinese plants to export excess product, taking away U.S. market share.

On July 1, 2007, China had eliminated the 13% VAT rebate on soda ash as well as on over 350 other items regarded as highly energy consuming and highly polluting. The reinstitution of the PRC's VAT rebate for soda ash will resume one of the many artificial supports for China's soda ash exports, and undermines the competitive conditions that allow U.S. exports to grow in the Asia-Pacific market, as well as others.

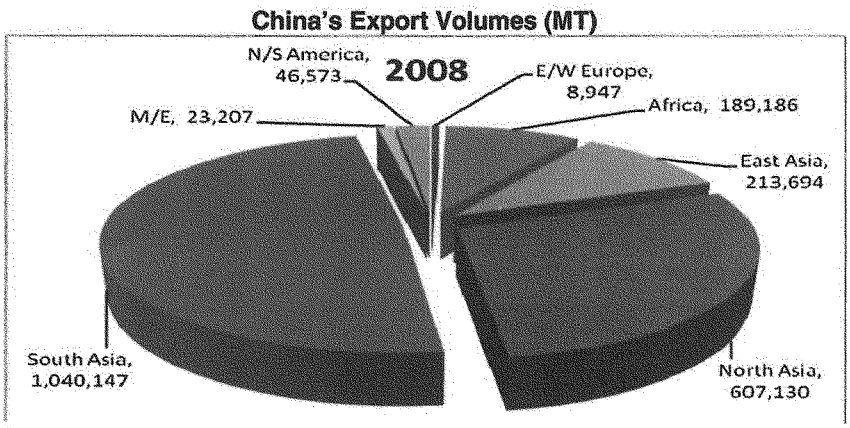
1) China's Rapid Growth as a Soda Ash Producer and Exporter

China's soda ash production has expanded more than 525% since 1989, growing from 3 million metric tons (MT) to 18.8 million MT in 2008. Since 2003, China has been the largest soda ash producer in the world, surpassing even the United States, which has the world's largest trona reserves.

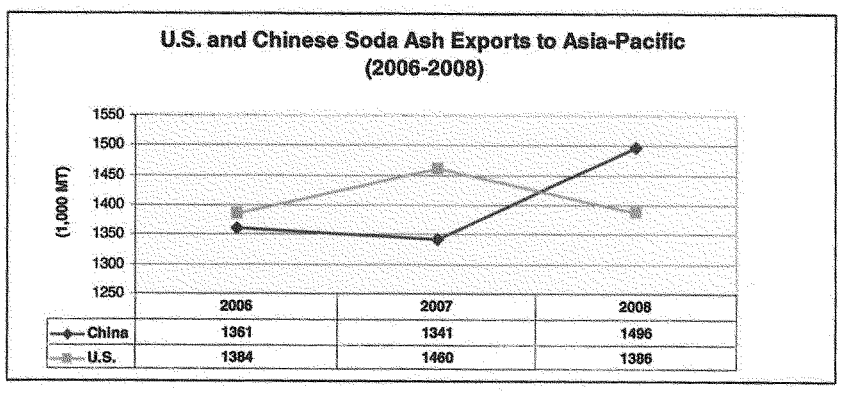
Between 2000 and 2008, China's soda ash production more than doubled. As over 75% of China's soda ash is produced by state-owned enterprises, China's rise as a soda-ash producing powerhouse is an example of the power and efficacy of the Chinese government to intervene in the economy. In fact, China's soda ash production has outpaced its domestic demand, resulting in a concerted effort to gain export market share.

From 2003-2008, China's export price has been consistently below its domestic price level. Chinese exports have grown dramatically, almost doubling in the last five years in step with its rapid increases in production capacity. As a result, U.S. exports are increasingly facing stiff competition from Chinese exports in key third-country markets. Approximately 11% of Chinese soda ash production was exported in 2008, primarily to ASEAN countries and other Asia-Pacific markets. In recent months, the price of exported Chinese soda ash, on a free on

board ("FOB") basis, has risen to exceed Chinese domestic price levels. By providing this 9% export rebate, the Chinese government is helping its producers remain competitive and gain market share outside of China.

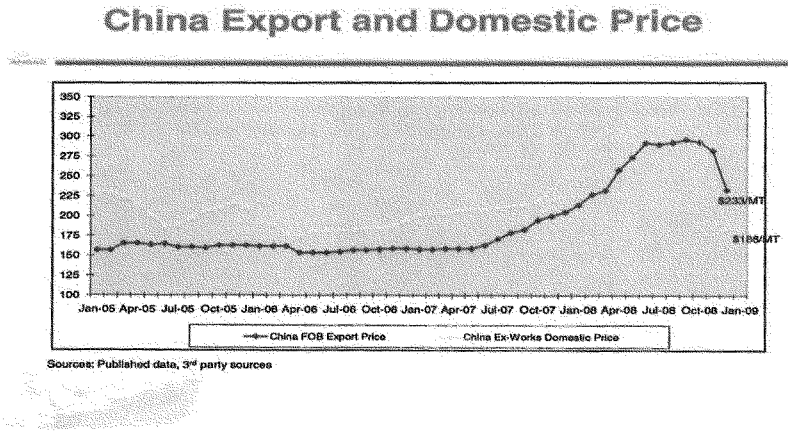


In 1996, the top four global markets for U.S. soda ash were Indonesia, Korea, Japan and Thailand. Combined, they accounted for $190 million in exports, or 37% of total U.S. exports. By 2008, exports to these four markets had fallen to $152.9 million, amounting to only 16.3% of total U.S. exports. At the same time, China's exports to the Asia-Pacific outpaced U.S. exports by at least 110,000 MT.



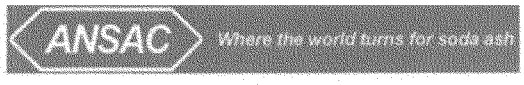
2) VAT Rebate Contributes to China's Export-Driven Soda Ash Expansion

An integral part of the PRC's campaign to develop its soda ash industry was initiated in January 1996 when China's State Council introduced a 9% direct tax refund for the country's soda ash exports. The inefficient soda ash industry in China expanded well ahead of domestic requirements, thereby requiring a dramatic increase in exports and the need for "artificial" financial support from the Chinese Government. This 9% tax incentive was subsequently increased to 13%, resulting in a significant price disparity between domestic and export sales prices. For example, for the period 2005-2006, China's export prices for soda ash averaged $38/MT less than domestic prices. The 13% VAT rebate for soda ash exports was a major incentive for Chinese producers to export. When the 13% VAT rebate was repealed in July 2007, export prices rose (see chart below) and the disparity between exports and domestic soda ash narrowed. This experience provides direct evidence that the newly-instituted 9% VAT rebate will drive China's export prices down while driving export volumes up.



3) Reasons PRC Should Again Eliminate the VAT Rebate for Soda Ash Exports

There are three principal rationales for why China eliminated its longstanding VAT rebate on soda ash in 2007. These reasons continue to be valid today. First, the PRC sought to deter the export of products deemed to have an adverse effect on the environment (See, WTO "Trade Policy Review Report by the Secretariat, China", April 16, 2008 WT/TPR/S/199 at p. 75). Roughly 45% of China's soda ash production is done through the so-called Solvay process, the major byproduct of which is calcium chloride, a well-known contributor to environmentally-harmful toxic sludge emissions. The Solvay process generates five times the amount of waste as naturally-sourced U.S. soda ash.



Second, Chinese authorities wanted to reduce exports of highly energy intensive products such as soda ash. About 13.6 million BTUs per MT are required to produce China's synthetic soda ash, compared to 6.3 million BTUs per MT needed to produce natural soda ash.

A final motivation for the PRC to eliminate the VAT rebate on soda ash and other exports was to respond to the mounting criticism from trading partners over its staggering $177.5 billion global trade surplus in 2006. In 2008, China's global trade surplus rose to $290 billion, an increase of 63% from 2006. China's net $570 million trade surplus in soda ash contributed to its overall surplus, as there is almost no importation of soda ash into China.

4) Impact of VAT Rebate Elimination on Prices

Following the 2007 elimination of the 13% VAT rebate, the cost of China's soda ash exports increased. For example, spot prices for soda ash rose 12% in the third quarter of 2007, reaching as high as $210/MT in some parts of Asia. Market prices for Chinese exports continued to increase in 2008, reaching a high in the third quarter of $330/MT. However, the VAT tax rebate will likely cause Chinese domestic and export prices for soda ash to converge. We estimate the 9% VAT rebate gives China's domestic producers a competitive advantage of by as much as US$18/MT.

5) Benefit for U.S. Soda Ash Exports to Asia Region with Elimination of the 9% VAT Rebate

U.S. soda ash competitiveness in Asia depends on a level playing field. The elimination of the PRC's 9% VAT rebate will help U.S. exports to compete in Asia, allowing ANSAC to recapture some amount of lost market share. Although China maintains a significant shipping-cost advantage to Asian markets, U.S. soda ash producers can compete effectively due to production cost advantages and economies of scale.

Were it not for extraordinary levels of government support for domestic producers, China would be one of the largest and most promising foreign markets for U.S. soda ash. At the very least, the elimination of the 9% VAT rebate will provide U.S. producers opportunities for export growth over the long-term in third-country markets.

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April 2009

ABOUT ANSAC AND THE U.S. SODA ASH INDUSTRY

Soda ash (disodum carbonate) is a basic chemical raw material required to manufacture other basic commodities such as glass, detergents and other chemical products. Soda ash is a critical production input, accounting for roughly 60% of the raw material cost for glass production and 30% of the raw material cost for detergent manufacture.

U.S. soda ash is the most competitive (and environmentally-friendly) in the world due to a unique natural deposit of the soda ash raw material, trona, located in Green River, Wyoming, from which this country could supply world demand for 1,000 years. Over 90% of U.S. soda ash production is located in Wyoming, with the remainder produced from natural deposits in California. Nearly all other countries that produce soda ash use a synthetic process that costs at least twice the cost of U.S. soda ash and also creates pollution to the environment. The U.S. industry produces roughly one-third of total global output. Over 40% of U.S. production is exported. In 2008, U.S. exports reached $1.4 billion, making soda ash the largest inorganic chemical export. The U.S. industry directly and indirectly accounts for nearly 20,000 jobs in the United States. Because the domestic U.S. soda ash market has been flat for the past 10 years, export markets are critical to maintain industry growth.

ANSAC, headquartered in Westport, Connecticut, is the international marketing arm for four U.S. soda ash manufacturers: FMC Corporation, General Chemical, Solvay Chemicals and OCI Chemicals Corporation. ANSAC was formed to meet these challenges through creation of an integrated organization dedicated exclusively to exports. Its full time staff handles all aspects of export sales from plant to customer, taking title to product, assuming all transport and sales risks, negotiating volume reduced logistics contracts with railroads and vessel owners, and securing dedicated warehouses, ships and other facilities to store and handle their product. Since ANSAC's inception in 1983, logistics costs have been dramatically reduced, reliability of supply has been significantly enhanced and U.S. soda ash exports have more than tripled.

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April 15, 2009

The Honorable Ron Kirk
U.S. Trade Representative
600 17th Street, NW
Washington, DC 20508

Dear Ambassador Kirk:

This letter requests your assistance in a matter of great importance to the promotion of U.S. soda ash exports.

On March 27, 2009, the People's Republic of China (PRC) issued a notice increasing the VAT export rebate for soda ash to 9 percent. This change in policy, which is detailed in the attached "China: Importance of VAT Rebate Elimination for U.S. Soda Ash Exports," is aimed at artificially increasing Chinese exports at a time when global demand continues to decline. It is clear that this is evidence that China is trying to export its way out of a recession, in this case, at the expense of U.S. soda ash exports and the U.S. jobs dependent on these exports.

ANSAC is the international marketing arm for four U.S. soda ash manufacturers who account for approximately 90 % of the U.S. soda ash production (see attached "About ANSAC and the U.S. Soda Ash Industry"). Roughly 40 % of soda ash produced in the United States is exported to markets in Asia, Africa, Latin America and Australia making soda ash the largest U.S. inorganic chemical export.

U.S. soda ash, which is a primary raw material in the manufacturing of glass and detergents, is the most competitive and environmentally friendly in the world due to a unique natural deposit of the raw material, trona, located in Wyoming. U.S. soda ash producers, which have an estimated 1200-year supply of natural soda ash deposits, are the most cost-effective and efficient producers of soda ash in the world. With U.S. exports in 2008 reaching $1.4 billion, soda ash is the second largest export from the Port of Portland, and thousands of jobs are dependent on this industry in a number of other U.S. states, including Connecticut, New Jersey, Georgia and Texas.

In 2003, China became the world's largest producer and consumer of soda ash. Roughly 45% of China's soda ash production is done through a synthetic process, the major byproduct of which is calcium chloride, a well-known contributor to environmentally-harmful toxic sludge emissions. This process generates five times the amount of waste as naturally-sourced U.S. soda ash. Moreover, Chinese synthetic soda ash production is highly energy intensive. About 13.6 million BTUs per metric ton are required to produce China's synthetic soda ash, compared to 6.3 million BTUs per metric ton needed to produce U.S. natural soda ash.

The recent PRC decision to offer the 9% VAT rebate to its exporters will further stimulate excessive capacity expansions in China. Chinese export prices, helped by the artificial incentive to export, will decline at the expense of U.S. exports, particularly in the Asia-Pacific region. This VAT rebate greatly restricts ANSAC's ability to compete against Chinese exports in third markets while we are in the midst of a major decline in global demand for soda ash. The new rebate is nothing short of irresponsible during this troublesome economic period.

Additionally, the export rebate represents an unfortunate policy shift in China that is harmful to China's own interests. In July 2007, PRC eliminated the 13% VAT rebate on soda ash exports. The decision to do this was, according to a WTO Report, designed to limit the export of products deemed to have an adverse effect on the environment and to reduce exports of highly energy intensive products such as soda ash. Consequently, the recent decision to reintroduce a VAT rebate on Chinese soda ash exports is a setback both for China and U.S. soda ash exporters.

The U.S. soda ash industry depends on a level playing in Asia in order to ensure our regional competitiveness. The PRC's institution of a 9 % VAT rebate will greatly diminish our competitiveness and will result in a significant loss in market share. Therefore, we respectfully urge you to consult with the appropriate senior Chinese government officials in an effort to remove the 9 % VAT rebate on soda ash.

We greatly appreciate your consideration of this matter of great importance to the U.S. soda ash industry.

Sincerely,

John M. Andrews

cc: Senator Michael Enzi
Senator John Barrasso
Congresswoman Cynthia Lummis
Mr. Peter Cowhey, USTR
Mr. Daniel Sepulveda, USTR
Mr. Timothy P. Stratford, USTR
Mr. Terry McCartin, USTR
The Honorable Secretary Gary Locke, Department of Commerce
Mr. Ira Kasoff, Department of Commerce

ANSAC

15 Riverside Avenue
Westport, CT 06880
Phone: 203-226-9056

John M. Andrews
President & CEO

July 17, 2009

The Honorable Hillary Clinton
U.S. Secretary of State
2201 C Street, NW
Washington, DC 20520

The Honorable Timothy Geithner
U.S. Secretary of the Treasury
1500 Pennsylvania Avenue, NW
Washington, DC 20220

Dear Secretary Clinton and Secretary Geithner:

In light of the upcoming meeting of the U.S.-China Strategic and Economic Dialogue (S&ED), ANSAC provides the attached case study highlighting the environmental implications of China's governmental support of its soda ash exports. ANSAC is the leading exporter of U.S. soda ash, and competes directly with Chinese soda ash suppliers in global markets. We urge that this case study be part of the S&ED's agenda relating to climate change and environmental concerns.

China's soda ash policy is a longstanding concern for the U.S. industry, but now has added significance as countries around the world aim to reduce greenhouse gas emissions. China's soda ash industry is highly energy intensive and polluting, consuming over 220 trillion BTUs of energy and emitting nearly 20 million tons of carbon dioxide on an annual basis. Due to its synthetic production methods, China's industry also causes irreparable environmental damage. Unfortunately, due to considerations related to the industry's employment of nearly 360,000 workers, China has actively promoted the capacity expansion of its soda ash industry, most recently with the reinstatement of a value-added tax (VAT) rebate for exports.

The attached case study provides reasons why China should consider rebalancing its policy towards more environmentally-sound industries and investments. ANSAC has already provided a memorandum for the U.S.-China Joint Commission on Commerce and Trade (JCCT) on the trade implications of the VAT rebate. The bottom line is that China's governmental support of its soda ash industry is not sound from a commercial, energy-conservation or environmental-protection perspective. We appreciate your efforts to address these concerns in the context of the S&ED.

Sincerely,

John M. Andrews
President & CEO

cc: Todd D. Stern, Special Envoy for Climate Change, U.S. Department of State
David Loevinger, Senior Coordinator for China Affairs, U.S. Department of Treasury

ANSAC

JOHN M. ANDREWS
PRESIDENT & CEO

15 RIVERSIDE AVENUE
WESTPORT, CT 06880
PHONE: 203-226-9056

October 1, 2010

The Honorable Timothy F. Geithner
Secretary of the Treasury
Department of the Treasury
500 Pennsylvania Avenue, NW
Washington, DC 20220

Subject: Request for OECD Review of VAT Rebates

Dear Secretary Geithner:

This letter respectfully urges the Department of the Treasury's support requesting that the Organization for Economic Cooperation and Development ("OECD") assess the impact on trade and global suppliers of value-added tax ("VAT") refund policies, particularly those of China, which are being used as an industrial policy tool for both promoting and discouraging exports. This assessment by the OECD would help bring greater worldwide attention to this practice and shed light on the extent of its impact on trade.

China's economic policies that impact soda ash are a longstanding concern for the U.S. industry. ANSAC is the leading exporter of U.S. soda ash and competes directly with Chinese soda ash suppliers in global markets. China has actively promoted the capacity expansion of its soda ash industry, most significantly with the use of variable VAT refunds for exports.

China's soda ash industry is highly energy intensive and polluting, consuming over an estimated 220 trillion BTUs of energy and emitting approximately 20 million tons of carbon dioxide on an annual basis. Due to its synthetic production methods, China's industry also causes irreparable environmental damage. Beijing pledged five years ago to reduce energy intensity by 20 percent by the end of 2010. In August, it announced it would reduce production in 18 heavy industries in an effort to meet its energy targets; however, the soda ash industry – a highly energy intensive industry – was not among them.

In June of this year, in response to a question relevant to China's VAT rebate from Senator Michael B. Enzi (R-WY), you addressed this issue as follows:

> Frequent Chinese VAT rebate modification on a range of products, including soda ash, is an ongoing concern for U.S. industry and the U.S. government. We… **will continue to work with** you and other members of Congress, U.S. industry, and **the governments of like-minded trading partners to press China… in multilateral fora** to abandon VAT rebate policies that distort trade. (Emphasis added) (June 10, 2010 Response to Senator Enzi)

Your interest in addressing this issue multilaterally has been shared by U.S. Trade Representative Ron Kirk and Commerce Secretary Gary Locke, as follows:

U.S. Trade Representative Ron Kirk

> "... Specific VAT rebate decisions in China can have substantial effects on the competitive positions of U.S. manufacturers that compete with Chinese manufacturers in the United States and in third country markets. We are particularly concerned that the Chinese government raised the export VAT rebate rate on soda ash from zero to 9 percent in 2009, at a time when world demand for soda ash had slowed... this Administration will continue to work with... like-minded trading partners to press China... **in multilateral fora like the WTO and the Organization for Economic Cooperation and Development**, to abandon its trade-distortive VAT rebate policies..." (Emphasis added) (March 1, 2010 letter to Senator Michael Enzi (R-WY))

Secretary of Commerce Gary Locke

> "... China's use of variable, product-specific VAT rebates on exports to achieve industrial policy objectives is a serious concern for the Department of Commerce. **We are engaged in ... multilateral fora to address this concern**, which is shared by other World Trade Organization members, regarding the potentially trade-distorting effects of China's VAT rebate policies..." (Emphasis added) (August 6, 2009 letter to Mr. John Andrews, President and CEO, American Natural Soda Ash Corporation)

At different points, China has both encouraged and discouraged exports of various products through adjustment of VAT rebates in order to meet its industrial goals.

WTO Attention Has Also Been Directed to China's VAT Rebates

The latest Trade Policy Review (TPR) of China at the World Trade Organization (WTO) was completed in June 2010. As per the WTO's Trade Policy Review Mechanism (TPRM), it included reports by the WTO Secretariat, the Chinese Government and an extensive and detailed exchange of views between China and other WTO Members involving more than 1,500 written questions.[1] The 2010 TPR of China is particularly significant. For the first time it addresses China's use of its VAT rebate policy as a means to *promote* exports. The U.S. Government asked China to explain its use of a variable VAT rebate and why it has maintained a VAT rebate on synthetically-produced soda ash, a product that is both energy-intensive and polluting. The U.S. argues that China has re-applied VAT rebates on products such as soda ash to promote their export and maintain employment during the global economic downturn.

China has consistently used the VAT as an instrument of industrial policy, applying it selectively to penalize imports and to encourage exports. China's VAT rebate policy supports Chinese businesses in a more subtle way than the provision of free land or electricity; but, it should be viewed as an equally important industrial policy that has the impact of distorting trade. The increase of VAT refund rates reduces the production costs of exported-oriented enterprises and strengthens their competitive capability.

China's VAT rebate policy is clearly inconsistent with its goal of rebalancing growth towards more domestic-led demand. Starting in 2007, the Chinese government reduced the VAT rebate on exports of labor-intensive and energy-intensive goods in an effort to direct its economy away from low-end production and toward high value-added exports. However, this policy was reversed in 2008 as part of China's stimulus program, to increase exports and to preserve jobs. From mid-2008 to mid-2009, China acted to raise VAT rebates on six separate occasions. In one example, China's Ministry of Finance and State Administration of Taxation

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[1] Documents relating to the 2010 TPR of China, including the Secretariat Report and the written exchange of views between China and other WTO Members, can be found on the WTO website at: http://www.wto.org/english/tratop_e/tpr_e/tp339_e.htm.

issued a notice on March 26, 2009 (Circular No. 43) that took affect on April 1, 2009, which raised the VAT rebate on over 3,800 tariff lines, including reinstating the VAT rebate on soda ash to 9%. Its VAT rebate policy demonstrates that China prefers to fall back into its old pattern where it relies on exports for growth.

On June 23, 2010 Global Trade Alert published its sixth report on protectionist measures implemented by countries since the first G-20 meeting in November 2008.[2] Notably, the report analyzed in detail 22 so-called "Jumbo Measures" that harm 15 or more G-20 trading partners and affect more than US$10 billion in trade. China's export tax (VAT) rebates are named as Jumbo Measure No. 1, a dubious distinction. Global Trade Alert estimates that China's export tax rebates impact 155 trading nations and could affect over $400 billion in world trade.

We appreciate your efforts to address these concerns in the multilateral context of the OECD.

Sincerely,

John M. Andrews
President & CEO

cc: United States Trade Representative Ron Kirk
Department of Commerce Secretary Gary Locke
Senator Michael B. Enzi
Senator John Barrasso
Senator Joseph Lieberman
Senator Robert Menendez
Senator Ron Wyden
Congresswoman Cynthia Lummis
Congressman David Wu
Congressman Earl Blumenauer

[2] See "Unequal Compliance: The 6th GTA Report" at www.globaltradealert.org.

ANSAC

JOHN M. ANDREWS
PRESIDENT & CEO

15 RIVERSIDE AVENUE
WESTPORT, CT 06880
PHONE: 203-226-9056

April 2, 2012

The Honorable Ron Kirk
U.S. Trade Representative
Office of the U.S. Trade Representative
600 17th Street NW
Washington, DC 20508

Subject: China's State-Owned Enterprises

Dear Ambassador Kirk:

On behalf of the American Natural Soda Ash Corporation (ANSAC), thank you for your recent testimony before the House Ways and Means Committee and Senate Finance Committee on the U.S. trade agenda, in which you made clear that strong trade enforcement, especially with respect to China, is a priority. ANSAC agrees that the United States must work vigorously to ensure that China lives up to its multilateral trade obligations.

One topic that deserves greater emphasis in the trade agenda is addressing the growing influence of China's state-owned enterprises (SOEs). USTR acknowledges this trend in its latest report on China's WTO Compliance, which notes, "Increasingly, trade frictions with China can be traced to China's pursuit of industrial policies that rely on trade-distorting government actions to promote or protect China's state-owned enterprises and domestic industries." So that U.S. companies aren't disadvantaged, ANSAC urges you to follow through with your pledge to "vigorously address the growing number of issues relating to state-owned enterprises in China" and work to ensure that China's SOEs do not impede the competitiveness of U.S. firms.

China's special treatment of SOEs is of particular concern to ANSAC because nearly half (48%) of China's soda ash production capacity comes from producers that are either fully or partially state-owned, including two of its four largest producers. The advantages these state-owned producers are provided allow China to overcome U.S. comparative advantage in soda ash production, with serious competitive implications in third-country markets. Among the policies that benefit Chinese soda ash producers are differential VAT rebates, which encourage the overproduction and export of soda ash. In recent years, Chinese soda ash has gained a greater foothold in other Asian markets, for example, which have been traditionally served by U.S. soda ash.

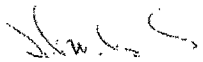
Export markets are essential to the growth of the U.S. soda ash industry and the 20,000 jobs in Wyoming, California, Oregon and Georgia that directly and indirectly depend on it. Since 2010, the United States has exported over 50% of its total soda ash production. Unfortunately, when the playing field isn't level due to the advantages given by the Chinese government to its state-run producers, the United States loses out.

As Chinese SOEs become more globally competitive, we urge USTR to continue its engagement in order to shape their business practices in appropriate bilateral and multilateral fora, including the Strategic and Economic Dialogue, the Joint Commission on Commerce and Trade, and in disciplines in any future U.S.-

China Bilateral Investment Treaty. Further, ANSAC hopes that the United States continues to press for strong SOE disciplines in the Trans Pacific Partnership (TPP) Agreement negotiations. Though China is not currently party to the negotiations, the TPP stands to have a lasting impact on the trade rules in the Asia-Pacific region. The United States should not pass up this opportunity to shape regional and international norms as they relate to SOEs.

We greatly appreciate your attention to this important matter to the U.S. soda ash industry and we look forward to your response.

Sincerely,



John M. Andrews

cc: The Honorable John Bryson, Secretary of Commerce
Senator John Barrasso
Senator Michael Enzi
Senator Frank Lautenberg
Senator Joseph Lieberman
Senator Robert Menendez
Senator Jeff Merkley
Senator Ron Wyden
Congressman Earl Blumenauer
Congressman James Himes
Congresswoman Cynthia Lummis

CHRISTOPHER B. DOUVILLE
PRESIDENT

15 RIVERSIDE AVENUE
WESTPORT, CT 06880
PHONE: 203-226-9056

August 21, 2013

Ms. Claire E. Reade
Assistant U.S. Trade Representative for China Affairs
Office of the U.S. Trade Representative

Mr. Craig Allen
Deputy Assistant Secretary for Asia
U.S. Department of Commerce

Dear Ms. Reade and Mr. Allen:

As you are aware, ANSAC has worked over the past several years to highlight the problems caused by China's manipulation of its VAT rebate rate. To the detriment of the U.S. soda ash industry, differential VAT rebates in China have encouraged the overproduction and export of soda ash by Chinese producers. An increased VAT rebate makes Chinese soda ash less expensive in the global marketplace, strengthening the competitiveness of China's soda ash industry in export markets. In recent years, Chinese soda ash has gained a greater foothold in other Asian markets, for example, which have been traditionally served by U.S. soda ash.

ANSAC was pleased that the results from the 23rd U.S.-China Joint Commission on Commerce and Trade included an agreement that "a Ministry of Finance-led delegation would hold discussions with the United States, beginning in the first half of 2013, in order to work toward a mutual understanding of China's VAT system and the concepts on which a trade-neutral VAT system is based." However, we understand this dialogue has not yet taken place and we are seeking information about its status.

ANSAC recognizes that this agreement does not reflect a pledge by China to modify its VAT system, but a bilateral dialogue is a step in the right direction. The United States should make use of this opportunity to enhance its knowledge of how China implements its VAT and provide China with a greater understanding of the benefits of a trade-neutral VAT system. In addition, the United States should emphasize that industrial policies such as VAT rebate manipulation do not contribute to the rebalancing of the world economy, which China has committed to at the G-20 and elsewhere.

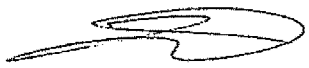
In 2010, China eliminated its VAT rebate on over 400 energy-intensive items; however, soda ash was not among them. This is peculiar, since China's soda ash industry is both highly polluting and energy intensive. China's VAT policy supports Chinese businesses in a subtler way than the provision of free land or

electricity; but, it is an equally important industrial policy that has the impact of distorting trade.

China's soda ash capacity and production continues to expand at a far greater pace than domestic demand. It's estimated over the next three years, the Chinese will add an additional 8 million MT of production capacity to reach 36 million MT by 2015, despite market conditions that include lower domestic demand and a global oversupply of soda ash. Expansion is encouraged by incentives such as the VAT rebate.

We ask that USTR and Commerce please keep ANSAC informed about what steps have been taken to prepare for this dialogue. ANSAC is happy to provide additional views and information on this initiative if needed.

Sincerely,



Christopher B. Douville

CBD/jlo's

Congress of the United States
Washington, DC 20515

May 5, 2009

The Honorable Ron Kirk
U.S. Trade Representative
600 17th Street, NW
Washington, DC 20508

Dear Ambassador Kirk:

We are writing to express our serious concern over the decision by the People's Republic of China (PRC) to begin offering, effective April 1, 2009, its soda ash exporters a 9% rebate on the 17% VAT. We strongly urge you and others in the Administration to convey the U.S. government's concern over this development and request that the rebate offer be promptly eliminated.

U.S. soda ash, which is a primary raw material in the manufacturing of glass and detergents, is the most competitive and environmentally friendly in the world due to a unique natural deposit of the raw material, trona, located in Wyoming. Over 40% of U.S. production is exported. With U.S. exports in 2008 reaching $1.4 billion, soda ash is the second largest export from the Port of Portland, and thousands of jobs are dependent on this industry in a number of other U.S. states, including Connecticut, New Jersey, Georgia and Texas.

In 2003, China became the world's largest producer and consumer of soda ash. Roughly 45% of China's soda ash production is done through a synthetic process, the major byproduct of which is calcium chloride, a well-known contributor to environmentally-harmful toxic sludge emissions. This process generates five times the amount of waste as naturally-sourced U.S. soda ash. Moreover, Chinese synthetic soda ash production is highly energy intensive. About 13.6 million BTUs per metric ton are required to produce China's synthetic soda ash, compared to 6.3 million BTUs per metric ton needed to produce U.S. natural soda ash.

The recent PRC decision to offer the 9% VAT rebate to its exporters will further stimulate excessive capacity expansions in China. Chinese export prices, helped by the artificial incentive to export, will decline at the expense of U.S. exports, particularly in the Asia-Pacific region. This will happen in the midst of a major decline in global demand for soda ash. The new rebate is nothing short of irresponsible during this troublesome economic period.

Moreover, the export rebate represents an unfortunate policy shift in China that is harmful to China's own interests. In July 2007, PRC eliminated the 13% VAT rebate on soda ash exports. The decision to do this was, according to a WTO Report, designed to limit the export of products deemed to have an adverse effect on the environment and to reduce exports of highly energy intensive products such as soda ash. Consequently, the recent decision to reintroduce a VAT rebate on Chinese soda ash exports is a setback both for China and U.S. soda ash exporters.

Therefore, we urge you and others in the Administration to immediately consult with the appropriate senior Chinese government officials in an effort to achieve the elimination of the April 1 9% VAT rebate on soda ash.

We greatly appreciate your consideration of this important matter to the U.S. soda ash industry and look forward to your response.

Senator Mike Enzi

Senator John Barrasso

Representative Cynthia M. Lummis

Senator Ron Wyden

Representative Phil Gingrey, M.D.

Representative David Wu

Senator Joseph I. Lieberman

Representative James A. Himes

Senator Jeff Merkley

Senator Robert Menendez

Senator Frank R. Lautenberg

cc: The Honorable Gary Locke
Secretary of Commerce

Congress of the United States
Washington, DC 20515

July 16, 2009

The Honorable Hillary R. Clinton
Secretary of State
U.S. Department of State
2201 C St. NW
Washington, D.C. 20520

Dear Secretary Clinton:

We request that during the upcoming Strategic and Economic Dialogue (SED) meetings you raise the harm that China's reinstatement of a 9% rebate of its 17% value-added tax (VAT) for soda ash exports has on the U.S. soda ash industry and on China's own efforts to reduce the production of energy-intensive and highly-polluting products.

Soda ash is a basic chemical commodity required to manufacture other basic commodities such as glass and detergents. Soda ash is a critical production input, accounting for roughly 60% of the raw material cost for glass production and 30% of the raw material cost for detergent manufacturers.

Producers of soda ash in the United States are the most cost-effective and efficient in the world because of the highly concentrated natural deposits of trona, the raw material of soda ash, in Wyoming's Green River Basin. Naturally produced U.S. soda ash (as opposed to the synthetically-produced product of China and other exporters) is the most environmentally-friendly and least energy-intensive in the world. Over 40% of U.S. production is exported, accounting for over $1.4 billion of exports in 2008. Soda ash is the second largest export from the Port of Portland in Oregon and thousands of jobs are dependent on the industry in a number of other U.S. states including Connecticut, New Jersey, Georgia, and Texas.

In 2003, China surpassed the United States and is currently the world's largest producer and consumer of soda ash. Approximately 95% of China's production is done through synthetic processes. The so-called Solvay process, which accounts for 45% of China's production, includes the co-production of calcium chloride, a substance with little commercial value that ends up being dumped in nearby waterways. Calcium chloride is a well-known contributor to environmentally harmful toxic sludge emissions and is toxic to both animals and humans. Moreover, China's coal-dependent synthetic soda ash production is highly energy intensive. U.S.-based natural soda ash production has a clear advantage over Chinese synthetic production from an energy and carbon-intensity standpoint.

China's reintroduction of the 9% VAT rebate is part of a disturbing industrial policy aimed at increasing its own soda ash exports during a time of plummeting global demand. The goal of reinstating the VAT appears to be an effort by China to keep its own employment high even when demand both within China and around the world is significantly down and when the country's production facilities are operating on average at 75% capacity. The consequences of

China's export stimulus policy are troubling. China's exports are climbing to unprecedented levels in regional markets and in nontraditional markets where the U.S. industry is struggling to compete.

China is continuing to build new synthetic soda ash plants, despite the negative environmental and energy consequences and the damage to world markets. Therefore, we ask that you raise our concerns with the Chinese Government during the SED meetings at the end of the month. We look forward to your consideration of this request and to the results of your meetings.

Sincerely,

Senator Mike Enzi

Representative Cynthia M. Lummis

Senator John Barrasso

Senator Ron Wyden

Representative David Wu

Senator Jeff Merkley

Senator Joseph I. Lieberman

Representative Phil Gingrey, M.D.

Representative James A. Himes

cc: The Honorable Gary Locke
Secretary of Commerce

The Honorable Ron Kirk
United States Trade Representative

Mr. Todd Stern
Special Envoy for Climate Change
United States Department of State

Congress of the United States
Washington, DC 20515

January 28, 2010

The Honorable Ron Kirk
U. S. Trade Representative
600 17th Street, N.W.
Washington, DC 20508

Dear Ambassador Kirk:

We are writing to express our gratitude to USTR for raising China's use of VAT rebates as a policy that is harmful to our economic relationship – and the case of soda ash, specifically – both in the context of the October 28-29, 2009 Joint Commission on Commerce and Trade (JCCT) in Hangzhou, and the July 2009 Strategic and Economic Dialogue held in Washington. Despite the issue being raised at the highest level, the Chinese apparently refuse to modify their trade-distorting VAT rebate policy. This is a troubling development, especially due to the negative impact that the VAT rebate continues to have on the U.S. soda ash industry.

As you are aware, effective April 1, 2009, China began offering its soda ash exporters a 9% rebate on the 17% VAT. This policy change has further stimulated excessive soda ash capacity expansions in China, has given China an artificial incentive to export, and has driven Chinese export prices down at the expense of U.S. exports. All of this is happening in the midst of a major decline in global demand for soda ash. The rebate is nothing short of irresponsible during this troublesome economic period.

Export data shows that during the first three quarters of 2009, China's soda ash exports have increased 9.8% as compared to the same period in 2008. The increase itself is dramatic, but even more so when compared to the fact that U.S. exports have fallen over 20% during the same period. Moreover, Chinese production in September 2009 surged to the second highest monthly output on record, while October 2009 production was the third highest on record. It is apparent that China's producers are paying little attention to market conditions and instead are being driven by artificial incentives, including the VAT rebate.

Concern over China's VAT rebate policy was also recently highlighted in the U.S.-China Economic and Security Review Commission's 2009 Annual Report to Congress. In the report, the Commission notes, "China has consistently used a 17 percent value added tax (VAT) as an instrument of industrial policy…China applies different rules for rebating its VAT in order to promote select industries." Among its ten "particularly significant" recommendations, the Commission urges the Administration to evaluate the use of selective VAT rebates by China and their trade-distorting effect and determine what steps, if any, should be taken to address the issue.

Given these facts, we strongly urge you and others in the Administration to take additional action to press China to withdraw its 9% VAT rebate on soda ash and urge China to cease using VAT rebates as a tool to artificially distort trade to its advantage.

We also ask that you put the VAT rebate policy on the agenda of the newly-formed vice minister- level working group with China's Ministry of Industry and Information Technology. We understand that

the agenda for this is still under formation, and we hope that you will ensure that any discussion of unfair trade concerns would include VAT rebates.

Finally, we urge you to engage multilaterally on the issue of VAT rebates. The United States is not the only country being adversely impacted by China's manipulation of its VAT for export promotion purposes. We encourage you to find appropriate multilateral forums to discuss the impact of the issue, such as the OECD Raw Materials Working Group, or appropriate working groups in APEC or the WTO.

We greatly appreciate your consideration of this important matter to the U.S. soda ash industry and look forward to your response.

Senator Mike Enzi

Representative Cynthia M. Lummis

Senator John Barrasso

Senator Joseph I. Lieberman

Representative Phil Gingrey, M.D.

Senator Robert Menendez

Representative David Wu

Senator Frank R. Lautenberg

Representative James A. Himes

Senator Jeff Merkley

Senator Ron Wyden

CC: The Honorable Gary Locke
Secretary of Commerce

Congress of the United States
Washington, DC 20515

May 31, 2011

The Honorable Gary Locke
U.S. Secretary of Commerce
1401 Constitution Ave., NW
Washington, DC 20230

The Honorable Ron Kirk
U.S. Trade Representative
600 17th Street, NW
Washington, DC 20508

Dear Secretary Locke and Ambassador Kirk:

We are writing to express our continued concerns about China's use of a Value-Added Tax (VAT) rebate to promote its soda ash industry at the expense of U.S. exports. For over two years, China has provided its domestic manufacturers with an artificial incentive to export through a 9% rebate of the 17% VAT. For a number of reasons, we ask that the issue of the soda ash VAT rebate be specifically included on the JCCT agenda this fall.

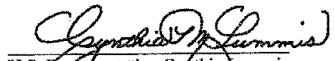
After suspending its VAT rebate for soda ash in July 2007, China reinstated the soda ash rebate in April 2009 to encourage its own exports during the global economic crisis. China's state-supported soda ash industry is the largest in the world and this policy is harmful to its international competitors, particularly U.S. soda ash manufacturers. As you may know, U.S. soda ash has a natural advantage over Chinese soda ash, based on a manufacturing process that is much more sustainable in terms of environmental protection and energy use than the synthetic processes used in China. China's manipulation of the VAT rebate to support its domestic soda ash industry also has wider implications – not only is it economically unjustified, it contravenes China's own interests in shifting energy resources from more productive and efficient industries.

We must focus on Chinese policies that are a direct threat to U.S. exports and U.S. jobs. The soda ash VAT rebate is one such policy. Chinese exports compete directly with U.S. soda ash exports in the Asia-Pacific market and beyond. Although the VAT is just one part of China's overall industrial policy, the soda ash VAT rebate is a distinct threat to U.S. manufacturing in a sector where the United States enjoys a natural competitive advantage. If we don't stand up for the pillars of our export-based manufacturers like the soda ash industry – and the U.S. workers employed throughout the soda ash supply chain – we cannot seriously contend we are doing everything we can to support U.S. exports.

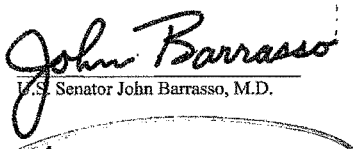
We ask that the Department of Commerce and the U.S. Trade Representative's Office ensure that the soda ash VAT rebate is raised at the highest levels with Chinese officials at the JCCT meetings this year. The message should be as clear as it is convincing; namely, China should live up to its repeated pledge to discourage the expansion of highly-polluting and energy-intensive sectors such as its own soda ash industry. Policies aimed at promoting soda ash exports, such as the VAT rebate, are inconsistent with China's own stated goals and a direct threat to U.S. interests.

We greatly appreciate your consideration of this request and look forward to your response.

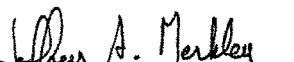
U.S. Senator Michael B. Enzi



U.S. Representative Cynthia Lummis



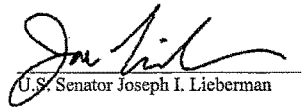
U.S. Senator John Barrasso, M.D.



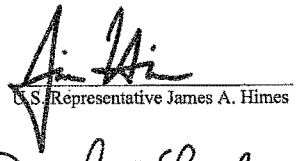
U.S. Senator Ron Wyden

U.S. Representative David Wu

U.S. Senator Jeff Merkley



U.S. Senator Joseph I. Lieberman



U.S. Representative James A. Himes

U.S. Senator Robert Menendez

U.S. Senator Frank Lautenberg

Congress of the United States
Washington, DC 20515

February 25, 2015

The Honorable Jacob J. Lew
Department of the Treasury
1500 Pennsylvania Avenue, NW
Washington, DC 20220

Dear Secretary Lew:

We are writing to urge the Treasury Department to expedite its work with the Chinese government to eliminate that nation's use of value-added tax (VAT) rebates to artificially promote Chinese exports. We are also requesting a report on the progress Treasury has made towards ensuring China fulfills the commitments they've made on this matter.

These commitments were made at the December 2012 U.S.-China Joint Commission on Commerce and Trade (JCCT) and the July 2014 U.S.-China Strategic and Economic Dialogue (S&ED). Of particular concern is the 9% rebate on the 17% VAT that China offers to its soda ash exporters. Members of Congress have twice written the Administration to highlight this issue (see attached letters from 2009 and 2011).

At the December 2012 JCCT, "China confirmed that a Ministry of Finance-led delegation would hold discussions with the United States... in order to work toward a mutual understanding of China's VAT system and the concepts on which a trade-neutral VAT system is based." Most recently, at the July 2014 S&ED, China agreed to "improve its VAT rebate system... and to deepen communication with the United States... **including regarding its impact on trade**" (emphasis added).

China's April 2009 reinstatement of the 9% VAT rebate for soda ash exports is an example of its effort to influence commercial outcomes through industrial policy, which has helped China's state-owned soda ash industry artificially support its exports at the expense of U.S. exporters. Soda ash is a primary raw material used in the manufacturing of glass and detergents. Unlike China, whose soda ash is produced synthetically and in an energy-intensive manner, U.S. soda ash is more competitive because it is mined from naturally occurring deposits.

Despite China's 2012 commitment, we understand that bilateral consultations with China on the VAT still have not been held. Engagement by Treasury with China to end these trade-distorting practices is important for the global competitiveness of the U.S. soda ash industry and the jobs it supports.

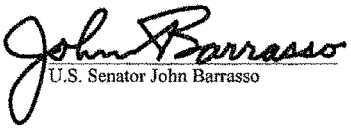
We greatly appreciate your consideration of this important matter and look forward to your response.

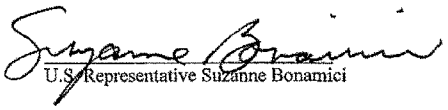
U.S. Senator Mike Enzi

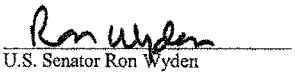
U.S. Representative Cynthia Lummis

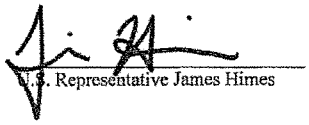

U.S. Senator Jeff Merkley

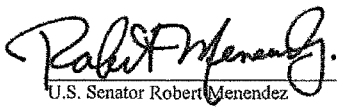

U.S. Representative Earl Blumenauer


U.S. Senator John Barrasso


U.S. Representative Suzanne Bonamici


U.S. Senator Ron Wyden


U.S. Representative James Himes


U.S. Senator Robert Menendez

Senator BARRASSO. Would you elaborate on the efforts that ANSAC and others in the soda ash industry have taken to eliminate China's rebate, China's value added tax rebate?

Mr. DOUVILLE. Yeah. It's in support of the, with the Industrial Minerals Association which represents all of the soda ash companies here in the U.S., as you said, have sent letters to the U.S. Trade Representative's Office, to the Secretary of State and to the Secretary of Commerce, I believe, I'm sorry, Secretary of the Treasury, the three of those, over the last five, six years. To date, we have received from the USTR a commitment that it will be included in JCCT discussions, and to date we are still pushing hard for that to happen.

Senator BARRASSO. Could I ask you about any other unfair trade barriers that are out that countries, other than China, have imposed on American soda ash exports?

Mr. DOUVILLE. Yeah, that's a great question. There's three in particular I'd like to talk about.

India has a market of around three million tons of demand. If you look at the future growth opportunities for U.S. soda ash, the Indian per capita consumptions are on five pounds per person. In the U.S., it's around 35. As India matures and that number grows from five to 35, you're talking about a 14 million ton opportunity. The Indian market has both import tariffs on U.S. soda ash as well as significant dumping duties for very diminimus quantities that have been shipped there.

In Vietnam, Mr. von Ahrens talked about the issue there with the soda ash plant that started up in June of this year with no environmental controls for a synthetic plant with a mass kill of fish for local fisherman. The government's response was we will look at relocating individuals and not so much as we will look at, you know, including environmental controls. But the two-percent that was added into the import duty for Vietnam started only about 12 months ago. So that was totally to support this new plant that came on.

In Taiwan, there's a 3.5 percent import duty with no soda ash operation there. And because of the Chinese trade agreements with Vietnam and Taiwan, they don't have import duties on either Vietnam or Taiwan.

Senator BARRASSO. Yes, and what steps have you taken to reduce these unfair trade practices?

Mr. DOUVILLE. We've sent letters to the Office. I don't have the name here, unfortunately, but to one of the offices within Taiwan, within Taipei. The responses we have gotten back are that they'd be interested in a larger free trade agreement but they're not interested in talking about individual products.

On a larger level, the Trans Pacific Partnership, we've been very supportive of that as well as the Trade Promotion Authority. If that were to happen, we would see benefits in both Vietnam and Japan, which could amount to a significant benefit for us.

Senator BARRASSO. Thank you.

Mr. von Ahrens, U.S. natural soda ash producers, according to your testimony, employ more than 3,000 full-time, skilled workers. About 1,000 of these are represented by the United Steel Workers. You go on to explain the production of soda ash from U.S. natural

resources in Wyoming and California is done by skilled workers with an average salary, I just want to make sure I got it right, an average salary of more than $85,000 per year and in very small rural communities.

Mr. VON AHRENS. Yes, and that number has actually gone up to almost $122,000 now.

Senator BARRASSO. Could you explain the importance of the soda ash industry, the jobs the industry provides to rural communities in Wyoming and in California?

Mr. VON AHRENS. During the last recession we actually did not even lose jobs in Sweetwater County. They look at us as a very stable employer. The industry, by far, is valued by the region as well as the state. They are some of the best jobs in the world.

Senator BARRASSO. Mr. Finn, would you explain the importance of the jobs that soda ash, the soda ash industry, supports at the Port of Portland?

Mr. FINN. Yes, Mr. Chairman.

As I mentioned in my remarks, we estimate that the average salary of those jobs to be about $50,400, which constitutes a good, healthy family wage job with benefits. The people employed by the soda ash, handling it at the Port of Portland include longshore labor, railway men, tugboat operators, river and bar pilots and several other occupations that depend on the export of soda ash.

Senator BARRASSO. Mr. von Ahrens, we talked a little bit about the two methods of producing soda ash, the natural method, utilizing Trona, and the synthetic process. The natural process, with significant environmental advantages over the synthetic process, it has always appeared that way to me. The synthetic process, I know, generates a large carbon footprint and has negative environmental impacts. I understand that all soda ash producers in the United States produce natural soda ash while China is the largest producer of synthetic soda ash.

Would you elaborate on some of the environmental advantages that natural soda ash has over synthetic soda ash?

Mr. VON AHRENS. Yes.

The primary is energy. To make the conversion from Trona to soda ash it takes about 30, just under 40 percent less energy to make that conversion as opposed to all synthetic manufacturing. In addition, there's other chemicals used in the process which leads to liquid and air emissions.

Senator BARRASSO. Also is it fair to say that for people who want to reduce the carbon emissions, they really ought to support taking steps to ensure the U.S. soda ash producers grow our market over, say, China synthetic soda ash producers?

Mr. VON AHRENS. Absolutely, including our customers who are looking at buying natural soda ash because of the natural lower greenhouse gas footprint as submitted in life cycle analysis. They see it as a benefit as well.

Senator BARRASSO. I want to go ahead and start now with Ms. Leiter and then ask any of the other witnesses if there is anything else you would like to add.

Ms. LEITER. I think I'd just like to emphasize that our mandate is to provide a fair return to the American taxpayer, and the best evidence we have in front of us of that fair market rate is the aver-

age of the private and state lease rates which is about 5.6. This would reduce the royalty rate for soda ash produced on Federal lands significantly below that fair market rate. It would reduce royalties to the Federal and State treasury.

And all of the data we have suggests that its only impact is that manufacturers of soda ash, quite sensibly, shift their production from private and state over to Federal leases but that it does not have the beneficial impacts on soda ash production, jobs and exports that the Committee is looking for.

Senator BARRASSO. Mr. Douville, is there anything you would like to add?

Mr. DOUVILLE. During the window from '06 through 2014—I talked before about just the window from '07 to '11. But during the window from '06 to '14 is about 1.4 million tons of increased exports during that window, the majority of which came during the times when the soda ash royalty was reduced. So the benefit on the export side has certainly been there.

Senator BARRASSO. Okay.

Mr. Finn, anything you would like to add?

Mr. FINN. No, sir. All I want to do is thank you for introducing us to S. 2031, and we urge the Committee to approve it.

Senator BARRASSO. Thanks.

Mr. von Ahrens?

Mr. VON AHRENS. My one request is that when we look at the data, we don't look at any single year. Our mine plans are 20 years long. Our business plans are five years long.

As we see the royalty rate potentially going up tomorrow, it will have an impact that will show up a year or two from now. And as Mr. Douville talked about, the headwinds are already upon us.

That's all I have to say, sir.

Senator BARRASSO. Well, thank you.

I want to thank all of you for being here. Before concluding the hearing I would like to enter into the record letters and testimony in support of the bill from the Governor of Wyoming, Matt Mead, his predecessor, Governor Dave Friedenthal, Natural Soda LLC, the Glass Packaging Institute, the Beer Institute and Union Pacific Railroad.

[The information referred to follows:]

MATTHEW H. MEAD
GOVERNOR

THE STATE OF WYOMING

STATE CAPITOL
CHEYENNE, WY 82002

Office of the Governor

September 28, 2015

The Honorable John Barrasso, U.S. Senate
307 Dirksen Senate Office Building
Washington, DC 20510

Dear Senator Barrasso,

I support S.2031, "The American Soda Ash Competitiveness Act" as proposed by you and Senator Wyden. There is a companion bill in the House, H.R. 1992, which I also support.

Wyoming is home to the nation's four largest producers of natural soda ash. This industry is a vital component of our economy. A five-year reduction of the federal royalty to two percent is necessary to the long-term competitiveness of this industry. It will protect jobs, improve long term revenues and allow capital investment for future growth and job creation. Lowering the royalty rate will not have a significant impact on future revenues. The rate reduction will not impact funding for Wyoming schools.

Congress has the opportunity to strengthen an industry, improve long term revenue outlooks and to increase jobs in Wyoming and other states in the Soda Ash industry supply chain. The bill before you reaffirms actions taken in the past to strengthen the soda ash industry. Previous actions of reducing the federal royalty illustrate how successful this has been for industry and I thank you for supporting the reinstatement of the two-percent royalty reduction.

Sincerely,

Matthew H. Mead
Governor

MHM:dh

cc: The Honorable Lisa Murkowski, U.S. Senate
The Honorable Maria Cantwell, U.S. Senate
The Honorable Ron Wyden, U.S. Senate

PHONE: (307) 777-7434

FAX: (307) 632-3909

David D. Freudenthal
Governor of Wyoming 2003 - 2011

September 29, 2015

Senator Jon Barrasso, M.D.
307 Dirksen Senate Office Building
Washington DC 20510
www.barrasso.senate.gov/public/index.cfm/contact-form

Senator Ron Wyden
221 Dirksen Senate Office Building
Washington DC 20510
www.wyden.senate.gov/contact/

Re: S. 2031

Dear Senators Barrasso and Wyden:

Over the years I have spoken with both of you many times about the importance of the soda ash industry to the national export economy and Wyoming. It is wonderful to see you sponsoring S. 2031 "American Soda Ash Competitiveness Act".

I want to add my voice to those supporting this measure at your October 1, 2015 hearing. Thoughtful, strategic proposals such as S. 2031 are the vehicle by which Congress can continue to aid the American economic recovery and enhance over export positions around the world.

The Administration has labeled its export efforts as the National Export Initiative. Its objectives are laudable but the continued growth in soda ash exports depends on Congressional approval of S. 2031 and the House companion bill H.R. 1992. The steps you are taking constitute real action and not just rhetoric.

And continued action is needed. The Chinese continue to provide competitive assistance to the synthetic soda ash industry at an accelerated rate. Plus the declining Chinese economy may well force more synthetic ash on to the international market just to get rid of the material.

The production of synthetic soda ash in China is not subject to the strenuous environmental protection standards we take for granted in the U.S. The natural soda ash produced in America requires

PO Box 531 • Cheyenne WY 82003 • Phone 307-287-6795 • Email Dave.freudenthal@gmail.com

less than ½ the energy used for synthetic soda ash. The CO2 emissions for synthetic soda ash are 2 to 3 times greater than the natural soda ash produced in Wyoming.

Everyone agrees the jobs created by the soda ash industry are great, well-paying jobs. And the employment is not just in Wyoming. The benefits stretch from Texas to the west coast.

As usual the only grumblings of discontent are from BLM. There is agreement that exports have increased. I respect BLM's position but it reflects the siloed nature of our current discussions. While there exists a credible argument that "net.net" Interior has gained revenue, the more important point is that the U.S. government has gained various other tax revenues, including added income tax. This country has gained employment and we have expanded exports. This royalty reduction remains a winner by any measure.

Again, thank you for your continued support.

Sincerely,

Dave Freudenthal

Cc: Senator Murkowski www.murkowski.senate.gov/public/index.cfm?p=Contact
Senator Cantwell www.cantwell.senate.gov/public/index.cfm/email-maria
Justin_Memmott@barrasso.senate.gov
Malcom_McGeary@wyden.senate.gov
Spencer_Grey@energy.senate.gov
Heidi_Hansen@energy.senate.gov

PO Box 531 • Cheyenne WY 82003 • Phone 307-287-6795 • Email Dave.freudenthal@gmail.com

Written Testimony of Sara Schaeffner, President and CEO of Natural Soda LLC

U.S. Senate Committee on Energy and Natural Resources, Subcommittee On Public Lands, Forests And Mining in support of S. 2031, the American Soda Ash Competitiveness Act

October 1, 2015

Chairman Barrasso, Senator Wyden and members of the Subcommittee on Public Lands, Forests and Mining, thank you for the opportunity to discuss with you today S. 2031, the American Soda Ash Competitiveness Act.

Natural Soda LLC, based in Rio Blanco County, Colorado, operates on the largest known, naturally occurring commercial deposit of sodium bicarbonate in the world and is one of the largest producers of baking soda for the food and beverage, health care, agriculture, industrial, pharmaceutical and specialty markets in North America. We export Colorado baking soda to nearly 20 countries across North America, South America, Asia, Australia, Europe and Africa.

At Natural Soda, we are continually looking to open new markets and to improve our ability to compete overseas against competitors that have the backing of governments with an export market share agenda.

S.2031, as proposed, is critical to Natural Soda's ability to realistically compete with overseas producers and to open new markets for our Colorado product. Reducing the royalty rate has significant economic benefits for the northwestern Colorado region, as well as our state and nation.

For more than 20 years, Natural Soda has been one of the most stable—and growing—employers in Rio Blanco County, and we have definitive plans to continue to grow by creating competitive advantages through expansion and scale. The royalty reduction is key to attracting the investment necessary to fulfill these plans and create a truly world class operation on this unique

intergenerational resource. When that happens, we will continue to invest in our employees and create new jobs, and to invest in the community by expanding our facilities, thereby improving the tax base and further reinvesting through community engagement.

Both Colorado and the United States are strengthened by increased exports of American made and produced products. With the highest product quality ratings from the food and pharmaceutical industries, Natural Soda's pure, organic baking soda is being sought across North America and the rest of the world, but it must be able to compete in global markets to fulfill its true potential.

S.2031, as proposed, represents an important commitment to making U.S. exports competitive and helping create jobs in rural Colorado. On behalf of Natural Soda and our more than 75 employees, I appreciate the committee's consideration of this legislation and look forward to working with you as you consider its merits.

September 29, 2015

The Honorable John Barrasso
Chairman
Subcommittee on Public Lands, Forests, and Mining
US Senate Committee on Energy and Natural Resources
304 Dirksen Senate Office Building
Washington, DC 20510

Testimony in Support of Senate Bill 2031

Dear Senator Barrasso:

On behalf of the Glass Packaging Institute (GPI), I am offering the following testimony in strong support of S. 2031, the American Soda Ash Competitiveness Act.

GPI is the North American trade association for glass container manufacturers and suppliers of materials to our industry, which includes our soda ash partners. **Soda ash is a key and necessary ingredient in the glass container manufacturing process, and is used daily in the country's 46 glass container plants to produce new food and beverage bottles and jars.**

For background, in 2006, Congress passed the Soda Ash Royalty Reduction Act (SAARA), which temporarily reduced the royalties collected on soda ash by the federal government from 6% to 2%. This was done in response to Chinese manufacturing of artificial soda ash. China's heavily subsidized manufacturing program has made it the largest producer of soda ash in the world.

The royalty reduction was meant to keep U.S. producers competitive and to ensure that the domestic soda ash production capability was maintained. SAARA expired in 2011, returning the royalty rate to 6%. This was later reduced to 4% in 2013, where it stands today. It is scheduled to return to 6% in October 2015.

The previous reduction in royalties turned out to have little impact on the federal budget, due to increases in soda ash production. Between 2002 and 2005 when the royalty rate was at 6%, federal royalties totaled $76 million. Between 2007 and 2010, the 2% royalty raised $74 million.

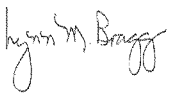
Despite this, the American soda ash industry has continued to lose ground to China, with American production dropping from 28% of world production in 2003 to less than 22% today.

The American Soda Ash Competitiveness Act would return the royalty to a 2% rate for 5 years. This would give the industry time to continue growing, protecting thousands of good-paying jobs. This will allow U.S. soda ash producers to expand in foreign markets, over time helping to reduce the U.S. trade deficit.

Additionally, promoting American soda ash is good for the environment. While American soda ash is found naturally, Chinese soda ash is produced synthetically. Chinese synthetic production uses twice the energy, resulting in over twice the carbon emissions as natural soda ash production.

GPI would like to thank you for considering our comments on S. 2031, and your leadership on this critical legislation.

Sincerely,



Lynn M. Bragg
President

440 First Street, NW, Suite 350
Washington, DC 20001

Phone. 202.737.2337
Fax 202.737.7004

BeerInstitute.org

September 30, 2015

Senator John Barrasso, Chairman
Subcommittee on Public Lands, Forests, and Mining
304 Dirksen Senate Office Building
Washington, DC 20510

Senator Ron Wyden, Ranking Member
Subcommittee on Public Lands, Forests and Mining
304 Dirksen Senate Office Building
Washington DC, 20510

Dear Chairman Barrasso and Ranking Member Wyden,

On behalf of the Beer Institute, the trade association for U.S. brewers and beer importers, I am writing in support of S. 2031, the American Soda Ash Competitiveness Act.

As you are aware, S. 2031 temporarily reduces the royalty producers must pay for sodium carbonate (known as "soda ash") mined on federal lands. This issue is important to the beer industry because soda ash is essential in the manufacture of glass bottles, including beer bottles.

The majority of soda ash mining operations in the United States occur on land leased from the federal government (primarily in the Green River Basin in Wyoming), and for every ton mined, producers must pay a royalty rate or fee. In 2006, to keep U.S. producers competitive in the tax-supported manufacture of artificial soda ash in China, Congress temporarily reduced the royalties collected on soda ash from 6% to 2%. The 2% rate expired in 2011 and while Congress reduced the royalty temporarily to 4% thereafter, without immediate action, the rate will increase to 6% in October of this year.

S. 2031 will return the royalty rate to 2% for the next five years. Reducing the royalty rate is an important step in supporting U.S producers who continue to lose market share to Chinese-manufactured artificial soda ash.

I applaud your efforts in introducing this important bill, and hope the Subcommittee passes it before the schedule fee increase. We also look forward to working with you to ensure its passage in both the House and Senate.

Sincerely,

James A. McGreevy III

President & CEO

BUILDING AMERICA®

September 29, 2015

The Honorable Lisa Murkowski
Chairman
US Senate Committee on Energy and Natural Resources
304 Dirksen Senate Office Building
Washington, DC 20510

Dear Senator Murkowski:

Union Pacific Railroad is pleased to provide this letter of support for S. 2031, the American Soda Ash Competitiveness Act.

The United States is the most competitive supplier of soda ash in the world. Union Pacific Railroad directly serves the world's largest natural soda ash reserve located near Green River, Wyoming. Approximately one-hundred and fifty Union Pacific Railroad employees in the Green River area are either directly or indirectly associated with the rail transportation of this important chemical product to domestic and international markets. Many more of Union Pacific's 47,200 employees are involved in moving soda ash to its final destinations.

The American Soda Ash Competitiveness Act would set the royalty rate on sodium compounds (and related products) produced from federal lands at 2 percent for five years. Without this needed legislation the royalty rate will increase to 6 percent on Oct. 2, 2015. By reducing the tax burden on domestic soda ash producers, this legislation provides opportunities for the soda ash industry to significantly improve their efforts to reinvest in their industry and to strengthen their ability to compete in global markets.

On behalf of Union Pacific Railroad, thank you for your consideration of our support of S. 2031.

Sincerely,

CC: US Senator Barrasso
US Senator Cantwell
Mike Rock, Union Pacific

UNION PACIFIC CORPORATION
1400 Douglas Street, 19th Floor
Omaha, Nebraska 68179

Scott D. Moore
Senior Vice President
Corporate Relations

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F 402-233-3383
E sdmoore@up.com

Senator BARRASSO. I want to thank each of you for being here today. Thank you for your time.

Some of the other members may submit written questions. I ask that you please promptly respond. The hearing record will be open for two weeks.

With that, the hearing is adjourned.

[Whereupon, at 3:25 p.m. the hearing was adjourned.]

APPENDIX MATERIAL SUBMITTED

II

114TH CONGRESS
1ST SESSION

S. 2031

To reduce temporarily the royalty required to be paid for sodium produced on Federal lands, and for other purposes.

IN THE SENATE OF THE UNITED STATES

SEPTEMBER 15, 2015

Mr. BARRASSO (for himself, Mr. WYDEN, Mr. ENZI, and Mr. MERKLEY) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

---

A BILL

To reduce temporarily the royalty required to be paid for sodium produced on Federal lands, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the ''American Soda Ash Competitiveness Act''.

SEC. 2. REDUCTION IN ROYALTY RATE ON SODA ASH.

Notwithstanding section 102(a)(9) of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701(a)(9)), section 24 of the Mineral Leasing Act (30 U.S.C. 262), and the terms of any lease under that Act,

the royalty rate on the quantity or gross value of the output of sodium compounds and related products at the point of shipment to market from Federal land in the 5-year period beginning on the date of enactment of this Act shall be 2 percent.

○

U.S. Senate Committee on Energy and Natural Resources
Subcommittee on Public Lands, Forests, and Mining
October 1, 2015 Hearing: S. 2031
Questions for the Record Submitted to Ms. Amanda Leiter

Questions from Senator Ron Wyden

Question 1:
I understand that the environmental footprint, including greenhouse gas emissions, of U.S. soda ash production is dramatically lower than synthetic production in countries like China. In analyzing the proper royalty rate, how has the Administration factored in the environmental advantages of U.S. production?"

Response:
The Bureau of Land Management (BLM) is mandated by section 102(a)(9) of the Federal Land Policy and Management Act of 1976 (FLPMA) to receive fair market value (FMV) for the development of Federal mineral resources. In the case of sodium leasing, royalty rates were determined by studying royalty rates for leases on comparable private land. While the Department of the Interior (Department) and the BLM conduct extensive environmental reviews when required by statute or regulation, a comparison of the environmental impacts of production of soda ash from Federal lands versus the impacts of synthetic production from other countries is not relevant to the statutorily-required FMV determination.

Question 2:
How does the Administration propose that U.S. soda ash production avoid being undercut by China's subsidies, through the value-added tax rebate or currency manipulation, for synthetic production?

Response:
The BLM is mandated by FLPMA to manage the development of mineral resources located on public lands in a manner that protects the quality of historical, ecological, and environmental resources, while also receiving fair market value for those mineral resources. The BLM does not consider matters of international taxes and currency when authorizing or determining what royalties to charge on production of soda ash from Federal land.

Questions from Senator Elizabeth Warren

Question 1:
The BLM does not support the royalty reductions of S. 2031 on the grounds that the legislation fails to ensure a "fair return to the U.S. taxpayer." As you note, if the two percent rate under this bill had been imposed during FY 2014 – a year in which Congress had already established reduced royalty rates – it would have cost taxpayers an additional $21 million.

Soda ash is far from the only resource that the federal government fails to receive a fair return on, however. After hardrock mining companies pay next-to-nothing to obtain rights to public land, they can mine on these lands without paying any royalties. Companies that drill onshore for oil and gas do have to pay royalties, but the 12.5% rate is substantially lower than rates charged by most states and private landowners. When it

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comes to coal, one analysis found that companies were so successful in exploiting loopholes that in practice, they only paid a 4.9 percent rate. I understand that the Department has already solicited public input on several of these issues.

Do you believe U.S. taxpayers are currently receiving a fair return on hardrock mining, coal mining, and onshore oil and gas drilling conducted on federal land?

Response:
Regarding the hardrock mining program, the President's FY 2016 budget includes a legislative proposal to reform hardrock mining by instituting a leasing process under the Mineral Leasing Act of 1920 for certain minerals, including gold, silver, zinc, copper, uranium, and molybdenum. If enacted, subject to valid existing rights, mining for these metals on Federal lands would be governed by the new leasing process and be subject to annual rental payments and a royalty rate that provides a fair return for the taxpayer.

Regarding the Federal coal program, the BLM recently hosted a series of five listening sessions across the country, in part to discuss how best to carry out its responsibility to ensure that taxpayers receive a fair return on the coal resources managed by the BLM. This discussion was initiated in response to Secretary Jewell's call for "an honest and open conversation about modernizing the Federal coal program." The BLM is currently reviewing the public comments submitted as part of this discussion to determine whether policy changes are necessary to ensure a fair return for Federal coal resources.

Finally, regarding the Federal oil and gas program, in April 2015, the BLM issued an advanced notice of proposed rulemaking (ANPR) to seek public comment on potential updates to BLM regulations governing oil and gas royalty rates and rental payments, as well as other financial considerations. Among other things, the ANPR sought comment on potential changes that would provide the BLM with the flexibility to update the royalty rate in response to market conditions. The BLM received over 82,000 public comments in response to the ANPR. Those comments are currently undergoing internal agency review.

All of these efforts have the same aim: to evaluate the need to change existing policies and regulations to ensure a fair return for Federal resources, while also balancing economic, environmental, and other considerations, as required by applicable laws.

Question 2:
What other resources, if any, is the federal government failing to secure a fair return on?

Response:
As noted in the response above, the Department is taking steps through both the budgetary and regulatory processes to ensure that the public receives a fair return for its onshore mineral resources.

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Questions for the Record Submitted to Mr. Chris Douville

Questions from Senator Ron Wyden

Question 1: Thank you Mr. Douville. I think you know that I am also the Ranking Member of the Finance Committee where we talk a lot about international trade. I generally think trade is a good thing for American industry, but we want to make sure U.S. producers are treated fairly in the global market. In the case of your industry, I think one can accurately say that foreign countries are gaming the system and trying to gain a competitive edge at the expense of U.S. soda ash producers. For example, China, as you mentioned, offers rebates on the VAT tax for synthetic soda ash exports. How have China's policies, including value added tax rebates on soda ash and the recent currency devaluation, affected American soda ash producers ability to stay competitive in the global market?

China's policies have directly contributed to lost sales and market share for American soda ash producers in global markets. Due to the VAT rebate, currency devaluation and other support that the Chinese government provides its producers, Chinese soda ash manufacturers are better able to compete with U.S. natural soda ash in Asian markets.

As noted in the August 2015 article published in Industrial Minerals entitled "Chinese Soda Ash: Mission Creep," which I submitted for the record, China is being more aggressive with its soda ash exports in 2015 and its export policies have encouraged overproduction of synthetic ash by its domestic producers.

The combination of the VAT rebate and the currency devaluation gives Chinese soda ash exporters a $27 per metric ton benefit based on the same average export price of $200 per metric ton. At the projected 2.2 million MT of exports in 2015, these policies equate to approximately $60 million in benefits for Chinese exporters.

Question 2: You mentioned the environmental advantages of U.S. soda ash exports. Could you expand on the reasons why we should be encouraging U.S. natural soda ash exports instead of synthetic production in countries like China?

The production of synthetic soda ash is extremely energy-intensive and polluting, such that the resources committed to this industry could be more productively used elsewhere. As a result of government incentives, China now consumes more than 300 trillion BTUs of energy in the production of synthetic soda ash on an annual basis, which is more than the energy usage in six U.S. states. This production yields more than 27.5 million tons of carbon dioxide emissions, which is greater than the CO2 emissions of Tunisia and Croatia.

Despite these environmental costs, China provides incentives to its soda ash industry which have led to increases in production capacity, even though capacity has already exceeded domestic demand by more than 20%. Excess available capacity in China is

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more than 6.5 million metric tons, which is the same quantity as the total US natural soda ash exports on an annual basis. A cost-benefit analysis would suggest that the Chinese government should not be employing incentives to encourage capacity expansion in its synthetic soda ash industry.

U.S. natural soda ash consumes far less energy and produces fewer greenhouse gas (GHG) emissions than synthetic soda ash produced in China or Europe. When compared to the synthetic process in China, U.S. natural soda ash consumes 50 percent less total energy per ton of soda ash produced and has a lower greenhouse gas-delivered footprint to its global customers despite significant transport miles. The more environmentally-friendly U.S. natural soda ash reserves could supply world demand for approximately 400 years.

Synthetic soda ash production is not only a concern in China. In 2014, Vietnam applied a new 2 percent tariff on US soda ash in an effort to help promote the start-up of a new domestic synthetic soda ash operation. When this plant came on line in June 2015, its production started without any environmental controls, causing a mass fish kill and excessive air pollution. According to multiple media reports, it has become such a public health hazard that authorities have suggested relocating local households. I am submitting for the record three news articles outlining the environmental hazards of synthetic soda ash product in Vietnam and China.

Question from Senator Elizabeth Warren

Question: Mr. Douville, you represent the American Natural Soda Ash Corporation, "the export arm of the U.S. natural soda ash industry." As your testimony notes, aside from a blip in 2009 in the wake of the financial crisis, soda ash exports have increased every year over the last decade, which you attribute to congressional mandated reduced royalty rates for mining on federal lands.

But while soda ash exports have consistently climbed over the last 10 years, reduced royalty rates have varied considerably. In 2006, Congress set soda ash royalty rates at two percent. That reduction expired in 2011, and the rates jumped back up to six percent. In 2013, Congress reinstated lower rates, this time cutting them to four percent. None of these dramatic rate changes appear to have affected the slow, steady growth of exports.

In fact, other than 2010, as the industry rebounded out of the recession, the largest one-year increase in exports occurred in 2012, a year in which there were no royalty reductions in place. And in a 2011 report to Congress analyzing the 2006-2011 reduction in royalty rates, BLM failed to find evidence of a significant positive effect on exports or other economic outcomes.

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What evidence do you see for the claim that reduced royalty rates have had an effect on soda ash exports?

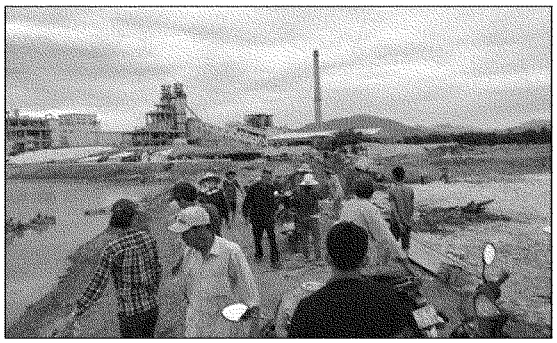
It can be misleading to view the royalty rate level and export figures statically and without considering other factors affecting exports. It would be wrong, for example, to expect that a change in the royalty rate would immediately result in a rise or fall of exports. Increasing exports is not like flipping a light switch. There is lag time between the lower rates and the impact as it takes time to ramp up operations. Contracts with customers abroad are not lined up exactly with the royalty timeframes.

The fact is that the soda ash industry's competitiveness is tied to a number of factors. But in times of global economic uncertainty and increased foreign competition – as existed in 2009 and again is the case today – the royalty rate makes a big difference. China has historically taken a competitive export advantage during the periods of higher royalties and has increased its market share. Given the current economic situation in China, U.S. export markets are at risk. A higher royalty rate, coupled with other higher costs (e.g., transportation), would put downward pressure on U.S. exports.

A higher royalty rate would compromise the ability of the U.S. industry to make investments that will allow us to expand exports to countries such as India, where the consumption of glass and detergents is rising. The U.S. industry needs all the advantages that can be offered and compatible with international trade rules to be globally competitive, thereby increasing U.S. exports that benefit American jobs.

Updated August, 04 2015 08:56:00

Soda production pollutes air, water in Quang Nam



Residents' fish ponds have been contaminated with waste water from Soda Processing JSC. — Photo vov.vn

QUANG NAM (VNS) — Residents in central Quang Nam Province's Nui Thanh District complain that their daily life has been disrupted by environmental pollution from the Chu Lai Soda Processing JSC.

The situation has been going on for two months since the company began operation in June.

Over 400 households in Tam Hiep Commune's Dai Phu Village have been affected by the water, air and noise pollution, said Le Minh Sa, head of Dai Phu Village.

"The old people suffer headaches and it's hard for children to concentrate on learning," he said.

"Fish have died en masse, they are floating all over the pond," Sa said, adding that

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the recent pollution incident was not the first occurrence.

Hundreds of residents gathered on July 17 at the company offices to ask for an explanation for the surge of pollution in their waters.

Two days later, the company stopped directly discharging waste water into the nearby Truong Giang River and neighborhood ponds. Now it is run through a waste treatment container before being dumped into the river.

Local residents said although the water is now being treated, the fish in the section of river already died en masse and so could not come back.

"We don't understand why the company discharges untreated wastewater into our ponds when the company has two waste water containers," said local resident Le Tam, 46.

The wastewater, however, was released not just into the river but also into residents' fish-breeding ponds located at the back of the factory, also killing all the fish.

Le Thi Hong, 46, said all the fish in her family's five ponds died on July 7. "My family lost about 250kg of fish," she said.

Local residents complained to the company many times and the company's leaders promised to settle the issues, but nothing has been done yet.

Everyday at 9pm, the company also emits fumes into the air, say local residents. The burning smell and chemicals in the air have made breathing difficult in the area.

Another Dai Phu Village resident, Doan Ngoc Dung, said, "We can't sleep at night. We can't watch television because we can't hear the voice due to noise is too loud," adding, "We also live with bad smells at night."

As soon as the local administration received complaints from local residents, it began work with state agencies to make a report and submit it to district authorities, said Nguyen Van Ninh, deputy chairman of Tam Hiep Commune's People's Committee.

At a June 24 meeting with the management board of Quang Nam Province's Chu Lai Open Economic Zone, and other agency and local representatives, the board requested the company compensate for the damage and coordinate a dialogue with local residents through local authorities.

The company pledged to stop discharging untreated waste water into the environment. However, one month later, the situation has yet to improve.

The Chu Lai Soda Processing JSC admitted in a signed document, that the excessive noise was due to gas and steam emissions from an experimental trial that has the company running at just 70 per cent capacity. Mysteriously, the company promised that once the factory is running at full capacity, the noise would decrease dramatically.

The company also offered another inadequate explanation for the burning sell. Supposedly it was due to a short-lived ammonia leak from a pipeline used to make soda ash. Residents, however, say the smell is a daily occurrence.

A representative of the company said all the environmental shortcomings will be settled in near future.

Local authority's statistics state that about 40 residents have died of cancer in the past three years, most due to lung cancer.

The local authorities suggested that responsible agencies move the 300 households living near the company to another location to relieve them.

The Chu Lai Soda Joint Stock Company is based out of a 20ha factory with a design capacity of 200,000 tones a year. It produces heavy and light soda ash used to manufacture construction-grade glass, industrial detergent, laundry detergent and paper. — VNS

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Highlight

Mountains of coal sludge still threat to lives in Quang Ninh

Wiping sweat from his forehead, 36-year-old Trinh Duc Sang took big strides along a road covered with muddy coal sludge and dirt to the place that was his home until just three weeks ago. He climbed a rickety ladder that buckled under his weight to reach his neigh-bour's house overlooking a creek. From there, he crossed into his old home.

Doctors treat patients for free at clinic in Ha Noi

For more than 20 years, Dang Thi Nhan, 67, has been waking up about 30 minutes earlier each day to bake cakes or prepare tea for two retired doctors in a clinic near her house in Ha Noi's Giap Bat Ward.

Wounds begin to heal between US, Viet Nam 1

Pham Ba Lu swore thousands of times that he "would not live under the same sky as the United States".

Water resources, eroding land need saving

Water management has become a major topic of discussion in recent years among Viet Nam's lawmakers, experts and society. The country has been struggling to deal with water-related issues such as a rising sea level, land subsidence and saline intrusion in the Mekong Delta. Lawmakers and experts shared their views on water management with Viet Nam News reporters Thu Van and Hoang Anh.

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ASIA PACIFIC

Pollutants From Plant Killed Fish in China

By NEIL GOUGH SEPT. 4, 2013

HONG KONG — Thousands of dead fish floating along a 19-mile stretch of a river in Hubei Province in central China were killed by pollutants emitted by a local chemical plant, provincial environmental officials said Wednesday.

Environmental protection officials said tests on water taken from the Fu River upstream from the metropolis of Wuhan revealed that extremely high levels of ammonia in the water were caused by pollution from a plant owned by the Hubei Shuanghuan Science and Technology Company.

The tests, conducted by environmental officials from Xiaogan City, revealed ammonia concentrations downstream from the plant as high as 196 milligrams per liter. The World Health Organization notes that naturally occurring ammonia appears in surface water at concentrations of about 12 milligrams per liter, while the similar figure for drinking water is around 0.02 milligrams per liter.

Shares in Hubei Shuanghuan were suspended from trading on the Shenzhen stock market Wednesday pending the release of an announcement. Calls to the company's headquarters were not answered on Wednesday. Provincial officials ordered the company's plant to cease production while the cause of the leak was investigated.

The plant produces sodium carbonate, used in making glass, and

ammonium chloride for fertilizer, according to local news media reports. It has been cited for environmental violations four times since 2008, said Ma Jun, director of the Institute of Public and Environmental Affairs, a Chinese nongovernmental organization that tracks air and water pollution.

"Each time it was ordered to be corrected, but this demonstrates that enforcement is way too weak and the cost of violations way too low," Mr. Ma said.

People living along the river said they first noticed fish dying on Monday morning, and a sickening stench began to fill the air, China National Radio reported. About 110 tons of dead fish have been cleared from the river, the state-run Xinhua News Agency reported Wednesday.

Environmental officials said the river was not used as a source of drinking water, and they urged residents not to panic. Spills in China have often set off runs on bottled water because of fears of contaminated supplies.

China's Ministry of Environmental Protection said water pollution was a serious concern, with industrial spills, farm runoff and untreated sewage all factors in degrading water quality. As of last year, nearly a third of the sections of major rivers it monitored were so degraded that the water was unfit for human contact, the ministry said in its annual State of Environmental Quality report, released in June.

The Fu River flows into the Yangtze, China's longest river and the source of drinking water for millions. Spills into the Yangtze and its tributaries remain a continuing problem despite huge investments in reducing pollution, Mr. Ma said.

"Even though it has a large volume of water, with 40 percent of China's wastewater dumped into this watershed we are concerned about the health of this river and the quality of its water," he said.

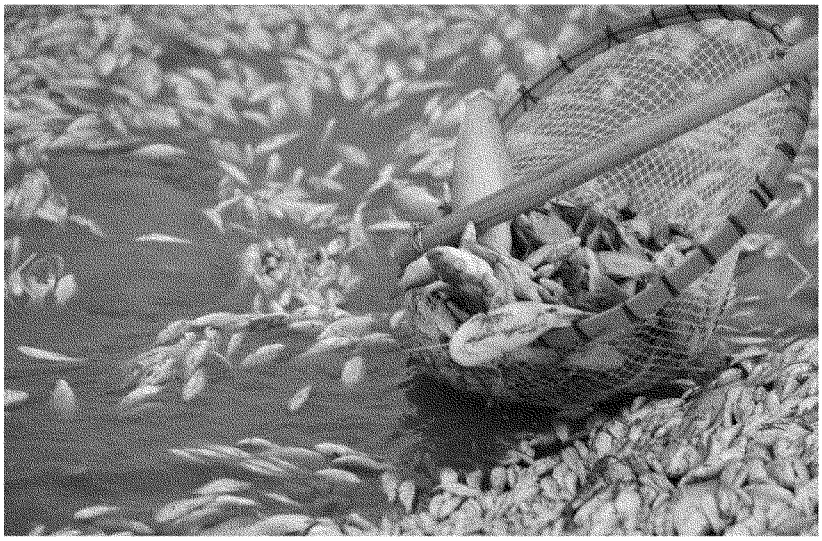
A version of this article appears in print on September 5, 2013, on page A8 of the New York edition

with the headline: Pollutants From Plant Killed Fish In China.

Tons of poisoned fish clog river in China's Hubei province

By Jethro Mullen, CNN

Updated 1:15 PM ET, Thu September 5, 2013



7 photos: Photos: Poisoned fish clog river in China

Poisoned fish clog river in China – Dead fish are cleared from the Fuhe River in central China's Hubei pro Tuesday, September 3. Officials believe that the fish were poisoned by high levels of ammonia disc the water from a chemical plant. The company has been ordered to suspend operations by provin environmental authorities.

1 of 7

Story highlights

Authorities have cleared about 110 tons of dead fish from the Fuhe River

After the thousands of dead pigs, come the tons of poisoned fish.

The Fuhe River is the scene of the latest disturbing example of river pollution in China.

Officials believe they were poisoned by ammonia from a chemical plant

The company has been ordered to suspend operations

The dead fish were found over a 40-kilometer stretch of the river in Hubei province

city of Wuhan.

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Authorities cleared about 110 tons of dead fish from a 40-kilometer section of the river in the central province of Hubei, the state-run news agency Xinhua reported Wednesday.

Images taken at the scene this week showed thousands of silvery fish carcasses blanketing large expanses of the river and its shore.

The cause of the deaths, provincial environmental officials said, was the discharge of high levels of ammonia into the water by a local chemical plant in Yingcheng, outside the

Kite detects pollution, shines light on Beijing smog

Samples taken at a water outlet from the plant on Tuesday indicated that ammonia density reached 196 milligrams per liter, a level "far in excess of the national standard," Xinhua reported, citing the provincial environmental protection department.

The World Health Organization says that natural levels of ammonia in groundwater are normally below 0.2 milligrams per liter and that surface waters can contain as much as 12 milligrams per liter.

The Hubei environmental authorities ordered the company that runs the plant, Hubei Shuanghuan Science and Technology Stock Co., to suspend operations at the plant and sort out its pollution controls, Xinhua said.

CNN made repeated calls for comment Thursday, but the company's office line was busy. Its stock was suspended from trading on the Shenzhen stock exchange Wednesday.

In an update Thursday, the environmental protection department said that a recent drought in the area had "caused (a) significant drop in water level, which decreased the river's capacity to hold pollutants."

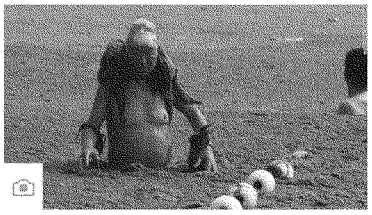
Domestic sewage mixed with untreated waste from the chemical plant and a paper mill "have caused the biological crisis" in the river, the department said in a statement.

Great green blob covers Chinese waters

'Serious' pollution problems

A villager who lives near the river, Li Songqing, told the local newspaper Chutian Metropolitan that the dead fish had been piling up since early Monday.

concern in China 03:27



6 photos: Swimming in slime

"Nearly all fish died out in this section, no matter if they were big or small," he said.

Environmentalists said this added to other problems in the area.

"The environment of this region is already under extreme stress," said Ma Tianjie, who manages Greenpeace's campaign against toxic chemicals in East Asia. "The addition of these incidents will definitely worsen the situation."

People on China's Twitter-like microblog service, Weibo, reacted to the news with a mixture of anger and sarcasm.

"Why can't we solve these problems and stop them from happening beforehand?" asked the user @Kanfangzu.

"The water quality must be fine, and this is just a mass suicide of the fish," quipped another user, @Niyaobuyaolianguidouhaipa.

The poisoning of the fish is the most recent pollution scandal in China, which has many rivers and lakes with water quality problems.

In a 2009 report, the Ministry of Environmental Protection said pollution of surface water "remained serious."

In the ministry's most recent report, it said that about 30% of the rivers that it monitors are considered to be polluted.

Earlier this year, the discovery of thousands of bloated pig carcasses in a river near Shanghai caused widespread alarm.

At the time, officials blamed local pig farmers for dumping the dead animals in the river.

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Questions for the Record Submitted to Mr. Rick Finn

Questions from Senator Ron Wyden

Question 1: First, you mentioned in your statement that the Port of Portland estimates about 200 direct, indirect, and induced jobs are associated with the handling of soda ash in Portland. Can you describe those kinds of jobs and the impact they have on the Port?

Answer: The employment associated with the export of soda ash from the Port of Portland comprises a wide variety of jobs requiring different skills, experiences, and education. Examples of the direct jobs would be longshore labor, terminal operators, railway personnel, tugboat crew members, river and bar pilots, and employees of marine construction companies. Indirect jobs would be with firms that provide office supplies, equipment, utilities, communications, maintenance and repair services, transportation services, and professional services to the soda ash export operation. Finally, induced jobs are those that support the local purchases made by the individuals holding the direct jobs. Examples of induced jobs would be with local grocery stores, retail outlets, restaurants, transportation services, local government services, schools, and hospitals.

Question 2: The Port of Portland receives soda ash by rail from the Green River Basin in Wyoming. Your written statement describes the spinoff benefits that this rail movement generates for other importers and exporters. Can you elaborate on those benefits?

Answer: The Union Pacific Railroad transports soda ash to the Port of Portland, and the railroad values the steady, reliable revenue that is generated by the long-haul shipment of this cargo. To sustain and grow this source of revenue, the Union Pacific invests in capital and operating improvements in the rail network between Wyoming and Portland, including the Portland metropolitan region. Other importers and exporters, unrelated to the export of soda ash, use this same rail network and benefit from the improvements that the Union Pacific has made. For example, shippers in eastern Oregon that export processed agricultural products use the Union Pacific alignment to transport their products through the Portland region to ports in the Puget Sound.

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Secretary-Treasurer

October 7, 2015

Dear Senator:

I am writing to express my support for S.2031 and H.R.1992, "The American Soda Ash Competitiveness Act," sponsored by Senators Barrasso and Wyden.

Natural soda ash is the country's largest inorganic chemical export by volume. More than 2.6m tons of natural soda ash is shipped out of the Port of Portland, ranking it as the port's second largest export behind wheat. A continued strong global market for natural soda ash is essential to the vitality of the port and to the jobs of hundreds of members of the International Longshore and Warehouse Union (ILWU), Local 8.

In addition, the ILWU has a number of members who work at the Port of Longview in Washington State and the Port of Long Beach in California. Both of these ports are also points of export for American produced natural soda ash.

It is our collective belief that a five-year royalty reduction to two-percent will lead to greater export volumes and will help safeguard the livelihoods of the dedicated ILWU members and others working at America's ports.

On behalf of the national ILWU and the proud union members of Local 8, I respectfully ask that you support and enact this important legislation.

Sincerely,

Robert McEllrath
International President

RMcE/akj cwa 39521

UNITED STEELWORKERS

USW

UNITY AND STRENGTH FOR WORKERS

LOCAL 15320

09-28-2015

This letter goes to the Honorable Senators who introduced bipartisan legislation, the American Soda Ash Competitive Act. Senators John Barrasso (R-WY), Mike Enzi (R-WY), Ron Wyden (D-OR), and Jeff Merkley (D-OR),

If passed, the American Soda Ash Competitiveness Act will temporarily reduce for five years the royalty rate on the output of sodium compounds on federal lands to 2%, which includes soda ash.

The U.S. soda ash industry would benefit from the reduced rate, helping U.S. soda ash to stay competitive in an export market increasingly distorted by China's industrial and economic policies. Most recently, China's 4.4% devaluation in its currency, the yuan (CNY), has led to an unfair promotion of China's synthetic soda ash exports at an artificially lower price. Furthermore, the Chinese Government continues to provide a rebate of its VAT for its soda ash exporters to the detriment of U.S. exporters.

In today's global trade climate and unfair foreign competition in the Asian market from China, the reduced royalty rate provides crucial support to the U.S. soda ash industry. Now, more than ever, our U.S. soda ash producers are relying on the foreign market.

U.S. soda ash provides good paying jobs with good benefits throughout the U.S., these workers contribute back to the U.S. economy billions of dollars annually. We need to continue to strongly support this industry.

Soda ash is a basic chemical commodity used in the manufacture of glass and detergents, in agriculture, and in health care. The U.S. exported $1.3 billion of soda ash in 2014, 32% of which was bound for markets in Asia.

As representatives of U.S. soda ash workers we support the American Soda Ash Competitive Act.

Sincerely,

Lester A. Maldonado
President, Lester A. Maldonado

Steve Roberts
Vice President, Steve Roberts

Ken Ball
Recording Secretary, Ken Ball

Mike Hernandez
Financial Secretary, Mike Hernandez

Ty Griffiths
Treasurer, Ty Griffiths

Sen. Ron Wyden Statement for the Record
Energy and Natural Resources Public Lands Subcommittee Committee Hearing
October 1, 2015

I appreciate the Chair for giving me an opportunity to provide a short statement for this hearing on our bill, the American Soda Ash Competitiveness Act. Soda ash is a critical material used to manufacture glass, detergents, and other industrial goods. In order to expand exports and help maintain U.S. competitiveness in the global market, the American Soda Ash Competitiveness Act will set the royalty rate for natural soda ash produced on federal lands at two percent for five years.

With over 6.5 million metric tons exported nationwide in 2014, soda ash is the United States' second largest inorganic chemical export by value. Soda ash is especially important in my part of the country where, in Oregon, 2.5 million metric tons of soda ash moved through the Port of Portland in 2014, sustaining hundreds of jobs. In fact, soda ash is consistently the Port of Portland's second largest export by volume. Lowering royalty rates to expand soda ash exports is critical for the industry's growth because the soda ash market is an international market, and some of our international competitors are trying to rig the system at the expense of American producers.

One example of how unfair foreign trade practices negatively impact the U.S. soda ash industry is evident in China's continued efforts to artificially support their soda ash exports. In an attempt to influence market outcomes through industrial policy, China offers Chinese soda ash producers a nine percent rebate on China's value added tax (VAT). It is estimated that China's VAT rebate gives Chinese soda ash producers a $27 per metric ton advantage over American producers.

There are also detrimental environmental results of the Chinese approach to soda ash production. The soda ash manufactured by Chinese producers is synthetic. The energy intensive production methods used to manufacture synthetic Chinese soda ash uses three times the amount of energy, and produces three times the amount of carbon emissions, than naturally produced U.S. soda ash. This means the environment suffers when it does not need to.

The success of past royalty rate reduction is evident. Between 2006 and 2011, Congress lowered the royalty rate for natural soda ash mined on public lands from six percent to two percent. The lower rate helped keep domestic producers competitive in tough economic times and resulted in hundreds of millions of increased investment. During that time, the soda ash industry's exports grew into more than a $1 billion per year and brought in tens of millions into the national Treasury.

Continuing royalty relief for domestic soda ash will keep the playing field level so American producers can stay competitive in a global market where China is gaming the system and producing synthetic soda ash exports at the expense of U.S. producers and the environment. With the current royalty rate reduction set to expire at the end of today, now is the time for Congress to act and create certainty for this thriving American industry.

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